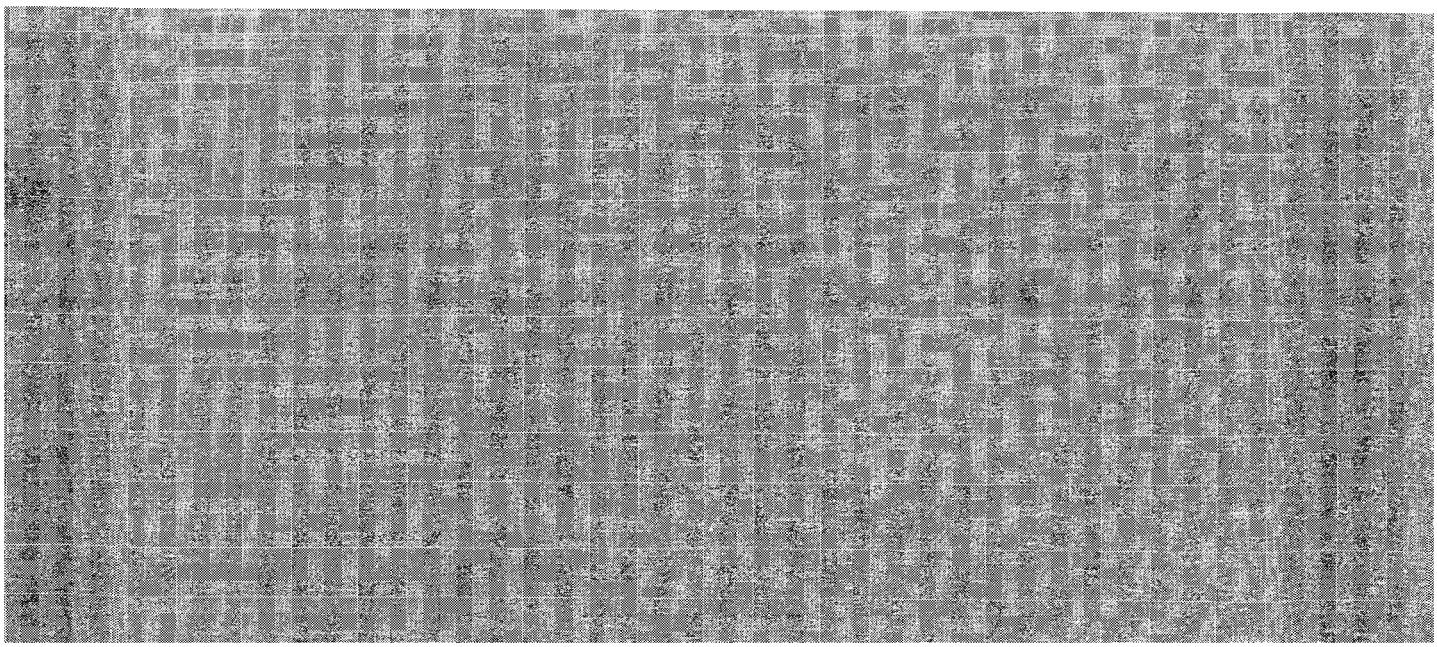
GoldStar

SERVICE MANUAL

MODEL : **RH4810**



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SUMMARY

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NEW FUNCTIONS OF HDD/DVD-RECORDER

• SUMMARY OF PRODUCT

- RECORDING FUNCTION OF DVD-RW AND DVD-R SPECIFICATIONS
  • DVD-RW: VIDEO MODE AND VR MODE RECORD AVAILABLE
  • DVD-R :VIDEO MODE RECORD AVAILABLE

- RECORDING FUNCTION OF HDD
  • TIMESHIFT
  • HDD TO DVD DUBBING
  • DVD TO HDD DUBBING

- DIGITAL DUBBING FUNCTION OF DV CAMCORDER BY USING DV TERMINAL (IEEE1394)
  • RECORD, PLAY, FF/REW FUNCTION BY REMOTE CONTROL OF DV CAMCORDER

- DVD PROGRESSIVE PLAY RESPONSE

- VARIOUS FUNCTION RESPONSE OF DVD RECORDING (DISC NAVIGATION AND CONVENIENT PLAY, EDIT FUNCTION)

- OUTSIDE INPUT AND TV RECORDING AVAILABLE
  • RECORDING SCREEN QUALITY :VR(HQ, SQ, LQ), VIDEO(HQ, SQ)

- TV RESERVE RECORDING FUNCTION (AUTO MODE SETTING AVAILABLE FOR RECORDING IN ACCORDANCE WITH THE REMAINING DISC SPACE IN RESERVATION)

SUMMARIZED EXPLANATION OF MAIN FUNCTION

• DVD RECORDING FUNCTION(VR MODE RECORD / VIDEO MODE RECORD)

1) VR MODE RECORD : MANUAL MODE RECORDING IN ACCORDANCE WITH VARIOUS EDITING FUNCTION, REMAINING DISC SPACE AND PROGRAM TIME DVD-RW DISC RECORDED IN THE VR MODE CAN BE PLAYED WITH A DVD PLAYER CORRESPONDING TO THE DVD-RW THERE IS ALSO A PLAYER TO BE PLAYED THROUGH FINALIZING. FOR THE DVD-RW, RECORDING AND EDITING IS AVAILABLE AT THE SAME DEVICE EVEN AFTER FINALIZING.

2) VIDEO MODE RECORDING : THERE IS NO EDITING FUNCTION SUCH AS VR MODE RECORDING BUT VIDEO MODE RECORDING IS PLAYED IN A GAME DEVICE (FOR EXAMPLE, "PLAY STATION 2") WITH PC, DVD PLAY FUNCTION CORRESPONDING TO DVD PLAYER, CAR DVD, DVD-ROM. TO PLAY IN ANOTHER DEVICE, FINALIZING IS REQUIRED. RECORDING, EDITING AND EDITING IS NOT POSSIBLE AFTER FINALIZING. HOWEVER, RECORDING IS ALLOWED AT THE DVD-RW DISC IF ERASING THE TITLE FINALLY RECORDED AFTER FINALIZING.

3) RECORDING MODE INITIALIZATION (A KIND OF FORMATTING): BEGINS INITIALIZATION AFTER SELECTING RECORDING MODE AS VR OR VIDEO MODE BY USING INITIALIZATION FUNCTION OF THE DISC SETTING MENU. INITIALIZES DEFAULT AS VR MODE FOR DVD-RW. RECORDS IT AS VIDEO MODE WITHOUT INITIALIZATION FOR VIDEO MODE.

4) FINALIZE: BEGINS FINALIZE AT THE DISC SETTING MENU DURING STOP.

• HDD RECORDING FUNCTION

1) TIME SHIFT

PRODUCT SAFETY SERVICING GUIDELINES FOR VIDEO PRODUCTS

IMPORTANT SAFETY NOTICE

This manual was prepared for use only by properly trained audio-video service technicians.

When servicing this product, under no circumstances should the original design be modified or altered without permission from LG Electronics Corporation. All components should be replaced only with types identical to those in the original circuit and their physical location, wiring and lead dress must conform to original layout upon completion of repairs.

Special components are also used to prevent x-radiation, shock and fire hazard. These components are indicated by the letter "x" included in their component designators and are required to maintain safe performance. No deviations are allowed without prior approval by LG Electronics Corporation.

Circuit diagrams may occasionally differ from the actual circuit used. This way, implementation of the latest safety and performance improvement changes into the set is not delayed until the new service literature is printed.

CAUTION: Do not attempt to modify this product in any way. Never perform customized installations without manufacturer's approval. Unauthorized modifications will not only void the warranty, but may lead to property damage or user injury.

Service work should be performed only after you are thoroughly familiar with these safety checks and servicing guidelines.

GRAPHIC SYMBOLS

The exclamation point within an equilateral triangle is intended to alert the service personnel to important safety information in the service literature.

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the service personnel to the presence of noninsulated "dangerous voltage" that may be of sufficient magnitude to constitute a risk of electric shock.

The pictorial representation of a fuse and its rating within an equilateral triangle is intended to convey to the service personnel the following fuse replacement caution notice:

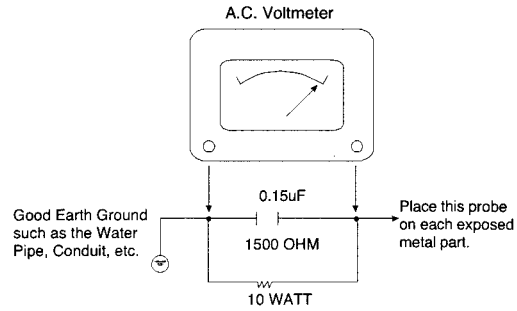
CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ALL FUSES WITH THE SAME TYPE AND RATING AS MARKED NEAR EACH FUSE.

SERVICE INFORMATION

While servicing, use an isolation transformer for protection from AC line shock. After the original service problem has been corrected, make a check of the following:

FIRE AND SHOCK HAZARD

1. Be sure that all components are positioned to avoid a possibility of adjacent component shorts. This is especially important on items trans-ported to and from the repair shop.
2. Verify that all protective devices such as insulators, barriers, covers, shields, strain reliefs, power supply cords, and other hardware have been reinstalled per the original design. Be sure that the safety purpose of the polarized line plug has not been defeated.
3. Soldering must be inspected to discover possible cold solder joints, solder splashes, or sharp solder points. Be certain to remove all loose foreign particles.
4. Check for physical evidence of damage or deterioration to parts and components, for frayed leads or damaged insulation (including the AC cord), and replace if necessary.
5. No lead or component should touch a high current device or a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces must be avoided.
6. After reassembly of the set, always perform an AC leakage test on all exposed metallic parts of the cabinet (the channel selector knobs, antenna terminals, handle and screws) to be sure that set is safe to operate without danger of electrical shock. DO NOT USE A LINE ISOLATION TRANSFORMER DURING THIS TEST. Use an AC voltmeter having 5000 ohms per volt or more sensitivity in the following manner: Connect a 1500 ohm, 10 watt resistor, paralleled by a .15 mfd 150V AC type capacitor between a known good earth ground water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500 ohm resistor and .15 mfd capacitor. Reverse the AC plug by using a non-polarized adaptor and repeat AC voltage measurements for each exposed metallic part. Voltage measured must not exceed 0.75 volts RMS. This corresponds to 0.5 milliamp AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.


A.C. Voltmeter
0.15uF
Good Earth Ground such as the Water Pipe, Conduit, etc.
1500 OHM
Place this probe on each exposed metal part.
10 WATT

TIPS ON PROPER INSTALLATION

1. Never install any receiver in a closed-in recess, cubbyhole, or closely fitting shelf space over, or close to, a heat duct, or in the path of heated air flow.
2. Avoid conditions of high humidity such as: outdoor patio installations where dew is a factor, near steam radiators where steam leakage is a factor, etc.
3. Avoid placement where draperies may obstruct venting. The customer should also avoid the use of decorative scarves or other coverings that might obstruct ventilation.
4. Wall- and shelf-mounted installations using a commercial mounting kit must follow the factory-approved mounting instructions. A product mounted to a shelf or platform must retain its original feet (or the equivalent thickness in spacers) to provide adequate air flow across the bottom. Bolts or screws used for fasteners must not touch any parts or wiring. Perform leakage tests on customized installations.
5. Caution customers against mounting a product on a sloping shelf or in a tilted position, unless the receiver is properly secured.
6. A product on a roll-about cart should be stable in its mounting to the cart. Caution the customer on the hazards of trying to roll a cart with small casters across thresholds or deep pile carpets.
7. Caution customers against using extension cords. Explain that a forest of extensions, sprouting from a single outlet, can lead to disastrous consequences to home and family.

SERVICING PRECAUTIONS

CAUTION : Before servicing the HDD/DVD Recorder covered by this service data and its supplements and addends, read and follow the SAFETY PRECAUTIONS. NOTE : if unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions in this publications, always follow the safety precautions.
Remembers Safety First:

General Servicing Precautions

1. Always unplug the HDD/DVD Recorder AC power cord from the AC power source before:
   (1) Removing or reinstalling any component, circuit board, module, or any other assembly.
   (2) Disconnection or reconnecting any internal electrical plug or other electrical connection.
   (3) Connecting a test substitute in parallel with an electrolytic capacitor.
   Caution : A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

2. Do not spray chemicals on or near this HDD/DVD Recorder or any of its assemblies.

3. Unless specified otherwise in this service data, clean electrical contacts by applying an appropriate contact cleaning solution to the contacts with a pipe cleaner, cotton-tipped swab, or comparable soft applicator.
   Unless specified otherwise in this service data, lubrication of contacts is not required.

4. Do not defeat any plug/socket B+ voltage interlocks with whitch instruments covered by this service manual might be equipped.

5. Do not apply AC power to this HDD/DVD Recorder and/or any of its electrical assemblies unless all solid-state device heat sinks are cerrectly installed.

6. Always connect test instrument ground lead to the appropriate ground before connection the test instrument positive lead. Always remove the test instrument ground lead last.

Insulation Checking Procedure

Disconnect the attachment plug from the AC outlet and turn the power on. Connect an insulation resistance meter(500V) to the blades of the attachment plug. The insulation resistance between each blade of the attachment plug and accessible conductive parts (Note 1) should be more than 1M-ohm.
Note 1 : Accessible Conductive Parts including Metal panels, Input terminals, Earphone jacks, etc.

Electrostatically Sensitive (ES) Devices

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field effect transistors and semiconductor chip components.
The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.

2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.

3. Use only a grouned-tip soldering iron to solder or unsolder ES devices.

4. Use only an anti-static solder removal device. Some solder removal devices not classified a "anti-static" can generate electrical charges sufficient to damage ES devices.

5. Do not use freon-propelled chemicals. These can generate electrical charge sufficient to damage ES devices.

6. Do not remove a replacement ES device from its protec tive package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil, or comparable conductive material).

7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

   Caution : Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily motions when handling unpackaged replacement ES devices. (Normally harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

SPECIFICATIONS

• GENERAL

Power requirements	AC 110-240V, 50/60 Hz
Power consumption	40W
Dimensions (approx.)	430 X 69 X 377 mm (16.9 x 2.7 x 14.8 inches) (w x h x d)
Mass (approx.)	6.4 kg (14.1 lbs)
Operating temperature	5°C to 35°C (41°F to 95°F)
Operating humidity	5 % to 90 %
Television system	PAL B/G colour system
Recording format	PAL

• RECORDING

Recording format	DVD VideoRecording, DVD-VIDEO
Recordable discs	DVD-ReRecordable, DVD-Recordable
Recordable time	DVD : Approx. 1 hour (HQ mode), 2 hours (SQ mode), 4 hours (LQ mode) HDD : Approx. 20 hour (HQ mode), 40 hours (SQ mode), 80 hours (LQ mode)
Video recording format	
Sampling frequency	27MHz
Compression format	MPEG 2
Audio recording format	
Sampling frequency	48kHz
Compression format	Dolby Digital

• DVD SPECIFICATIONS

Laser system	Semiconductor laser
Frequency response	DVD (PCM 48 kHz): 8 Hz to 22 kHz, CD: 8 Hz to 20 kHz
Signal-to-noise ratio	More than 100 dB
Harmonic distortion	Less than 0.008%
Dynamic range	More than 95 dB

• INPUTS

AERIAL IN	Aerial input, 75 ohms
VIDEO IN	1.0 Vp-p 75 ohms, sync negative, RCA jack x 2 / SCART
AUDIO IN	0 dBm more than 47 kohms, RCA jack (L, R) x 2 / SCART
DV IN	4 pin (i.LINK/IEEE 1394 standard)

• OUTPUTS

VIDEO OUT	1 Vp-p 75 Ω, sync negative, RCA jack x 1
S-VIDEO OUT	(Y) 1.0 V (p-p), 75 Ω, negative sync, Mini DIN 4-pin x 1 (C) 0.3 V (p-p) 75 Ω
COMPONENT VIDEO OUT	(Y) 1.0 V (p-p), 75 Ω, negative sync, RCA jack x 1 (Pb)/(Pr) 0.7 V (p-p), 75 Ω, RCA jack x 2
Audio output (digital audio)	0.5 V (p-p), 75 Ω, RCA jack x 1
Audio output (optical audio)	5 V (p-p), 75 Ω, Optical connector x 1
Audio output (analog audio)	2.0 Vrms (1 KHz, 0 dB), 600 Ω, RCA jack (L, R) x 1 / SCART

• ACCESSORY:

Video cable 1	Audio cable 1
RF Coaxial Cable.....1	SCART Cable 1
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SECTION 2

CABINET & MAIN CHASSIS

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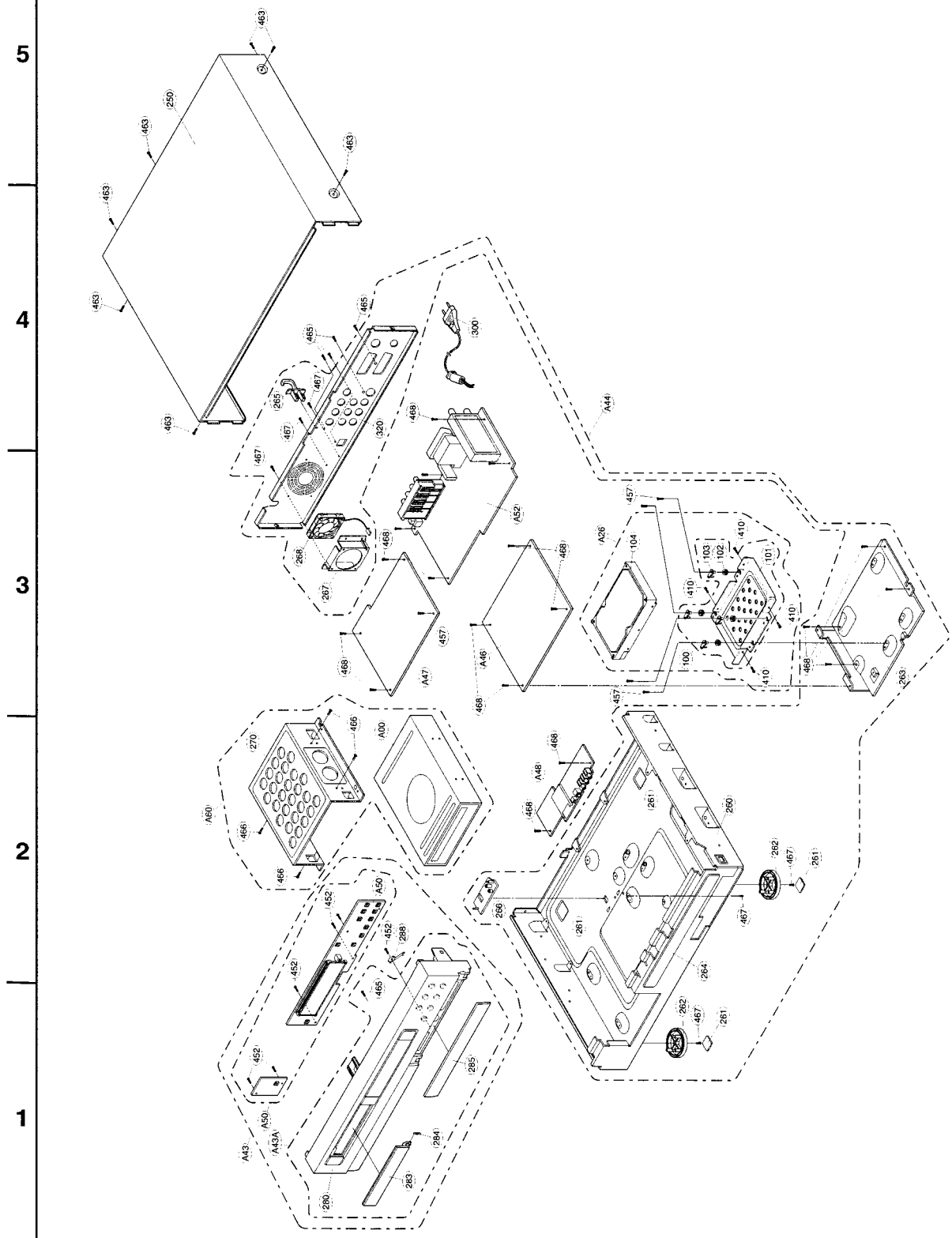
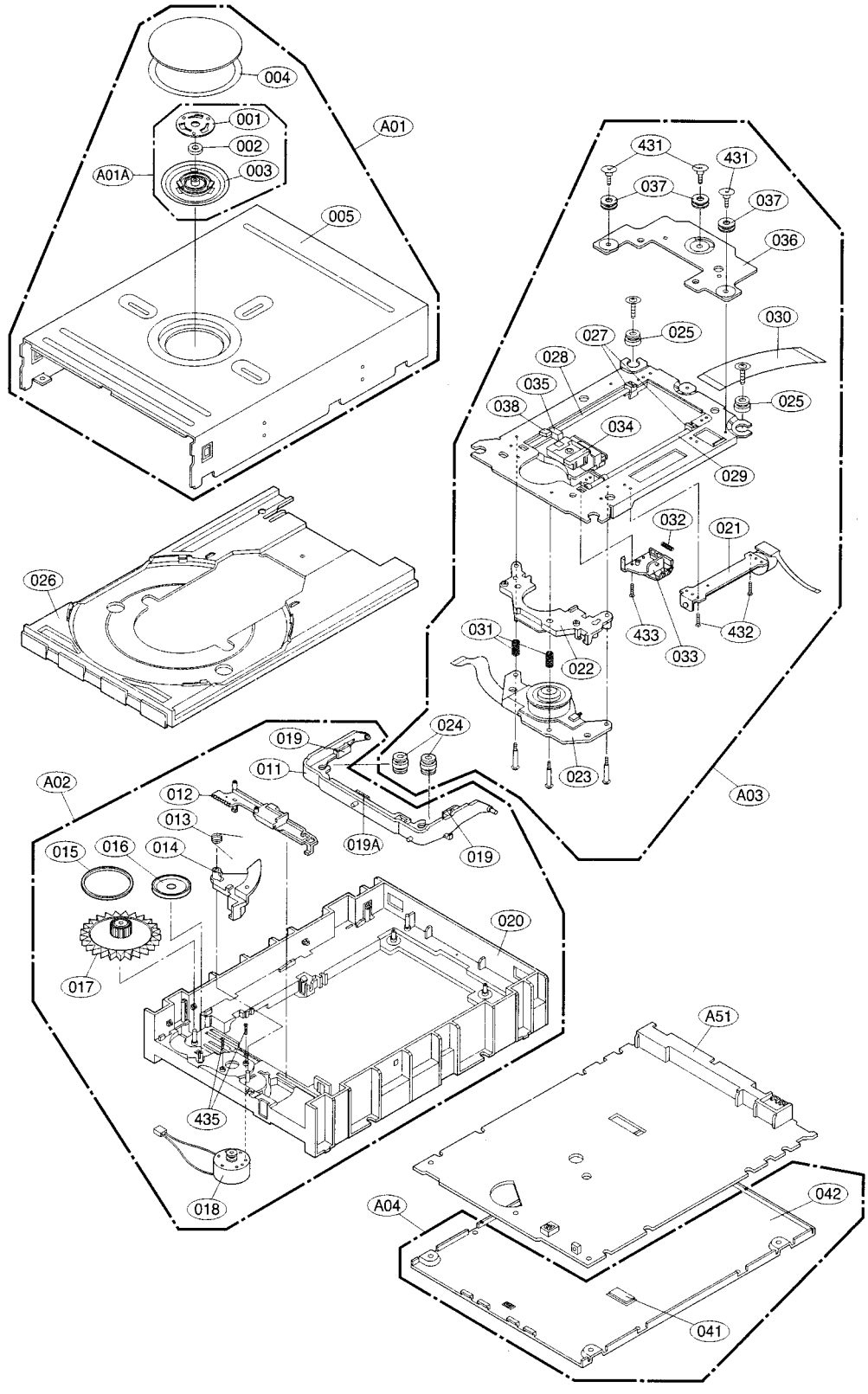
EXPLODED VIEWS

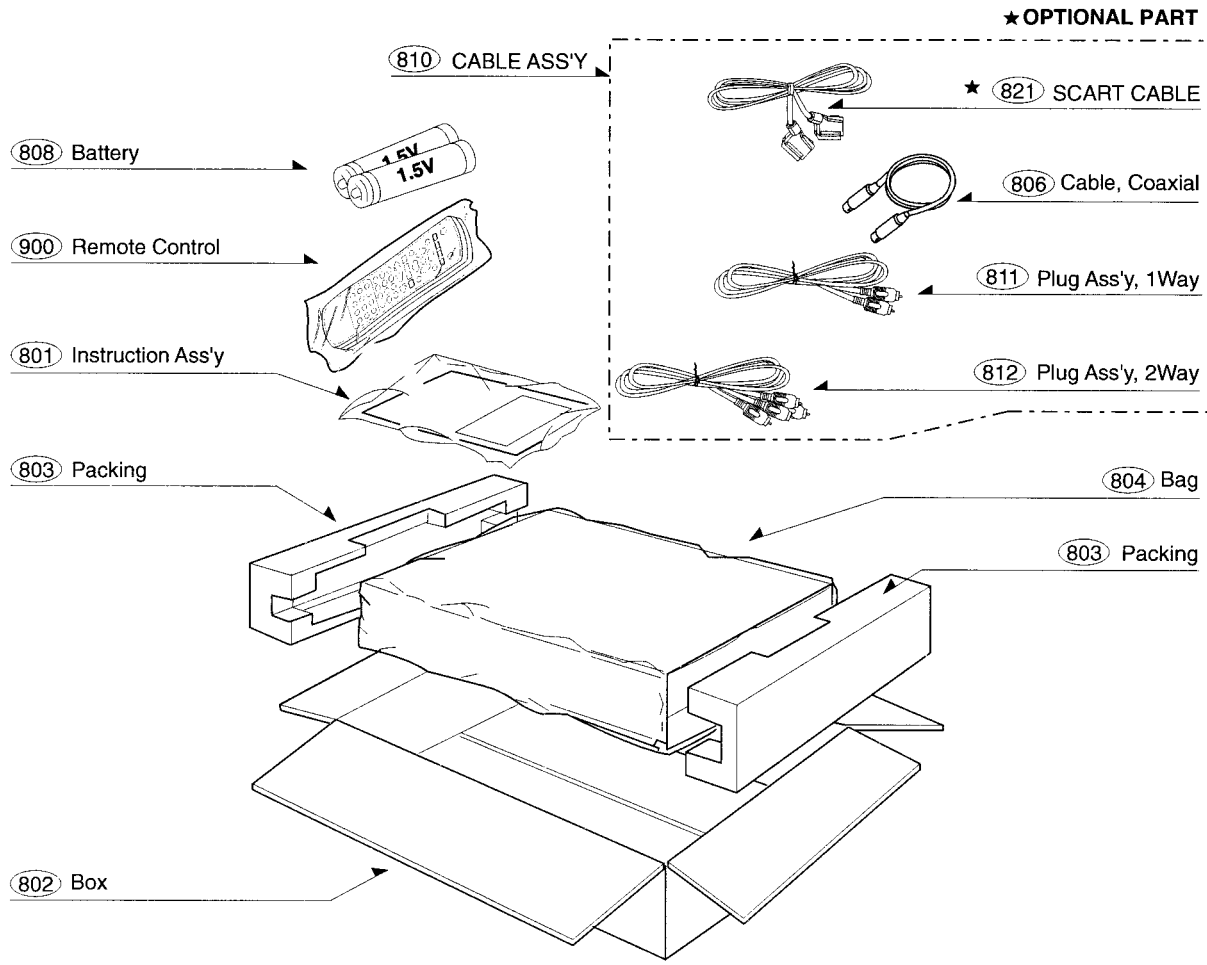
1. Cabinet and Main Frame Section



2. DECK MECHANISM SECTION(RL-01A)



3. Packing Accessory Section



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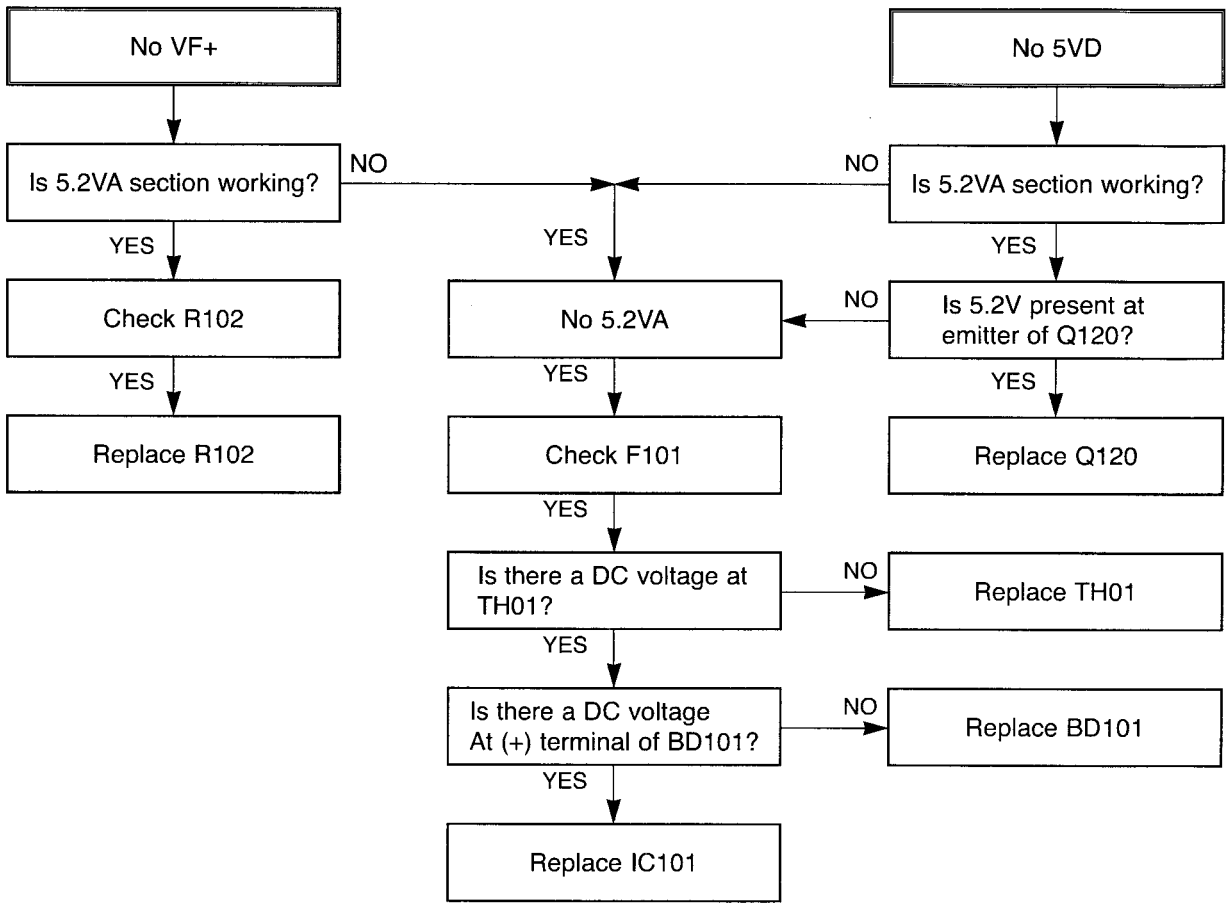
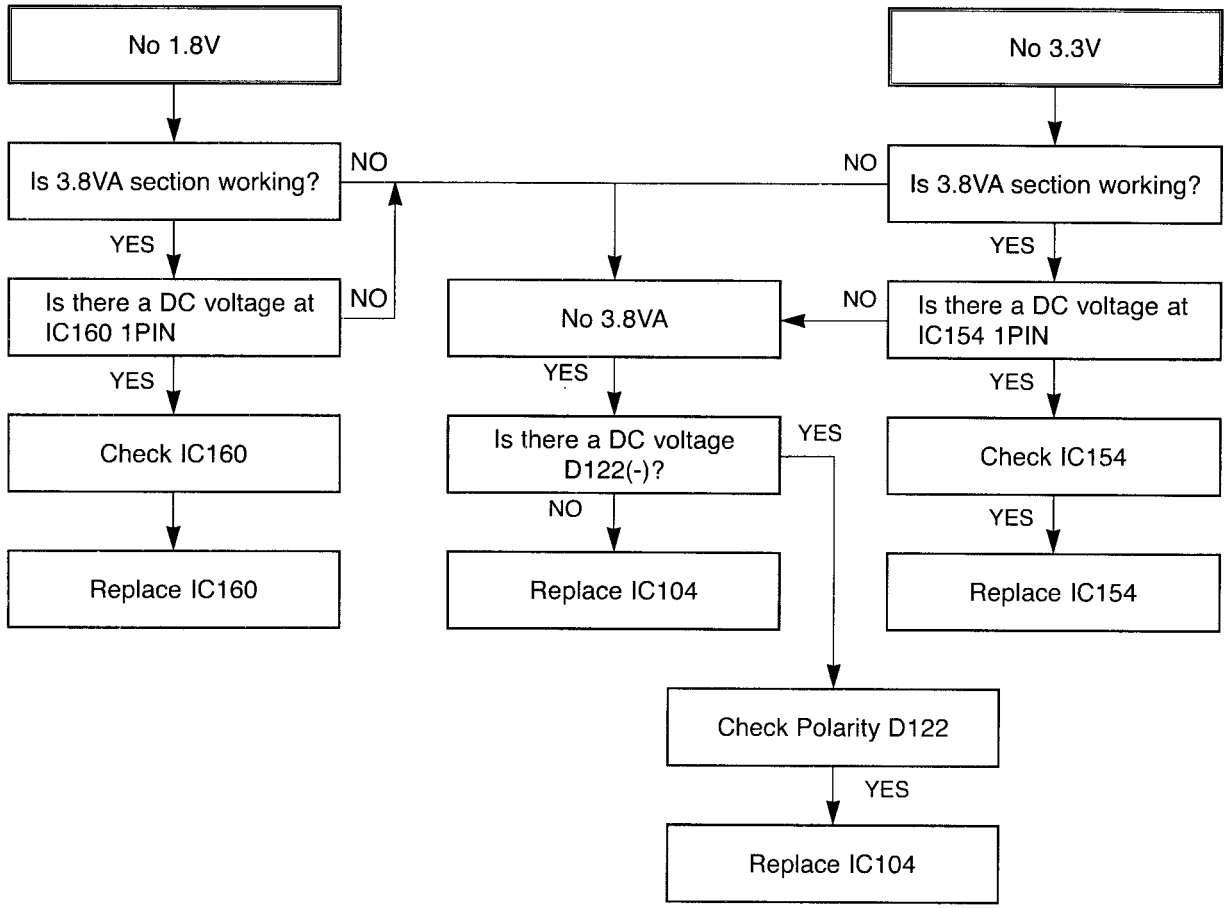
HDR PART

ELECTRICAL TROUBLESHOOTING GUIDE

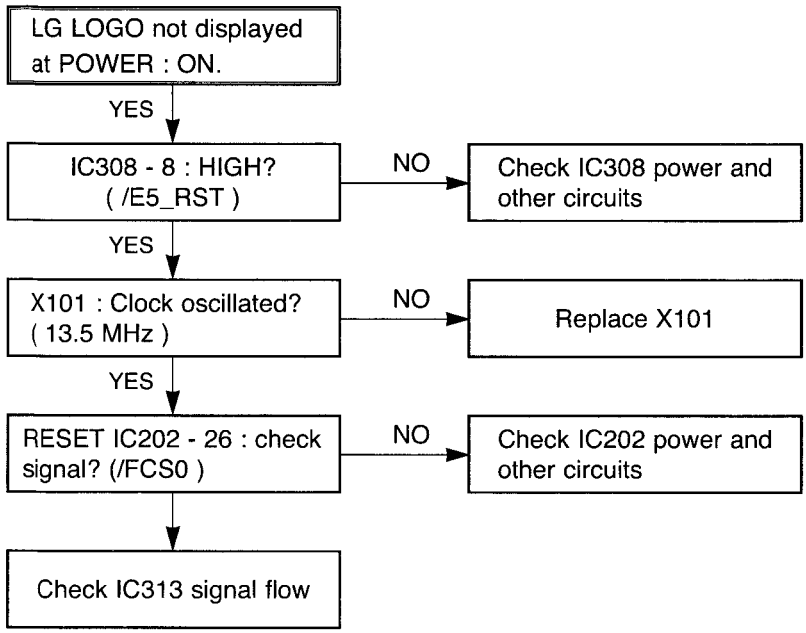
1. Power (SMPS) Circuit (Part 1)



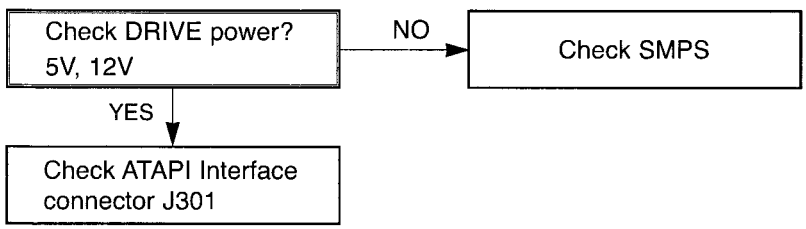
2. Power (SMPS) Circuit (Part 2)



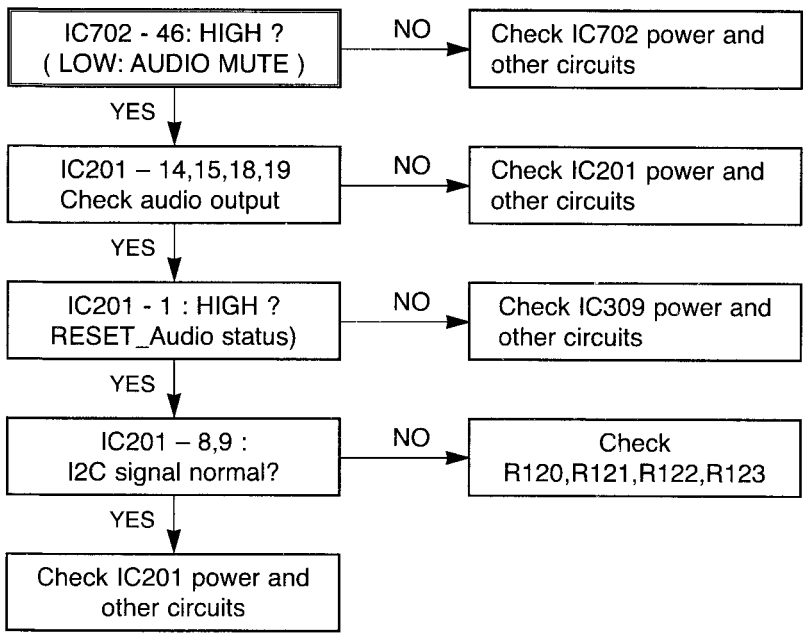
3. SYSTEM Circuit


LG LOGO not displayed at POWER : ON.
YES
IC308 - 8 : HIGH? (/E5_RST)
NO
Check IC308 power and other circuits
YES
X101 : Clock oscillated? (13.5 MHz)
NO
Replace X101
YES
RESET IC202 - 26 : check signal? (/FCS0)
NO
Check IC202 power and other circuits
Check IC313 signal flow

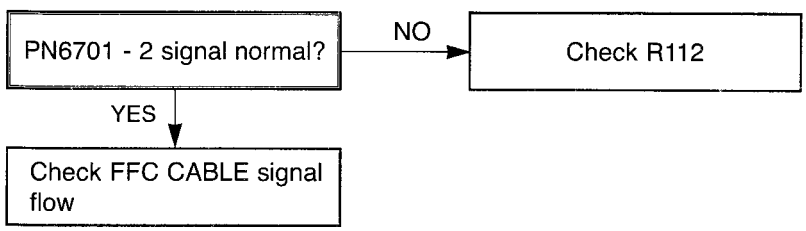
4. DISC not recognized.



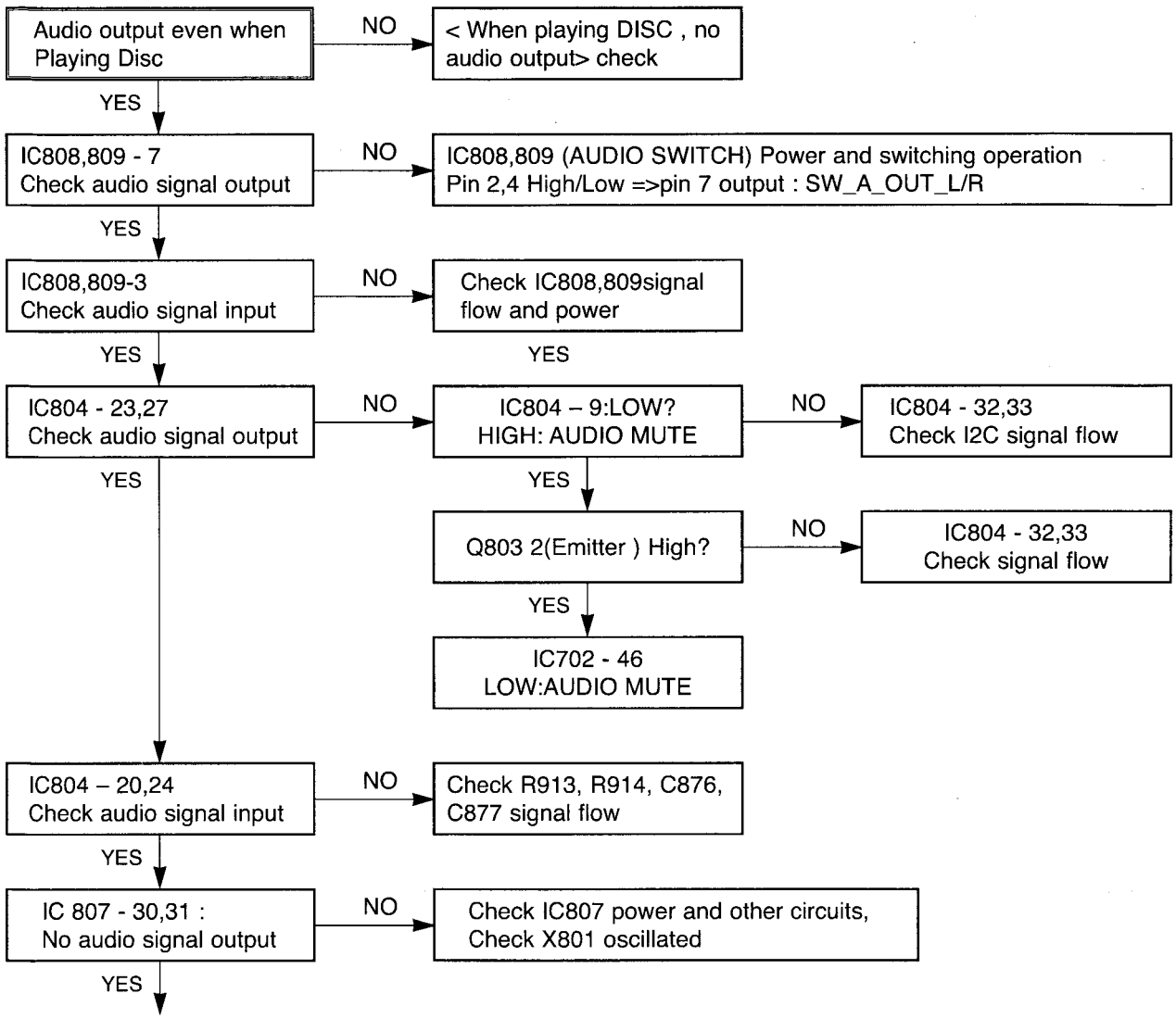
5. When playing DISC ,no audio output

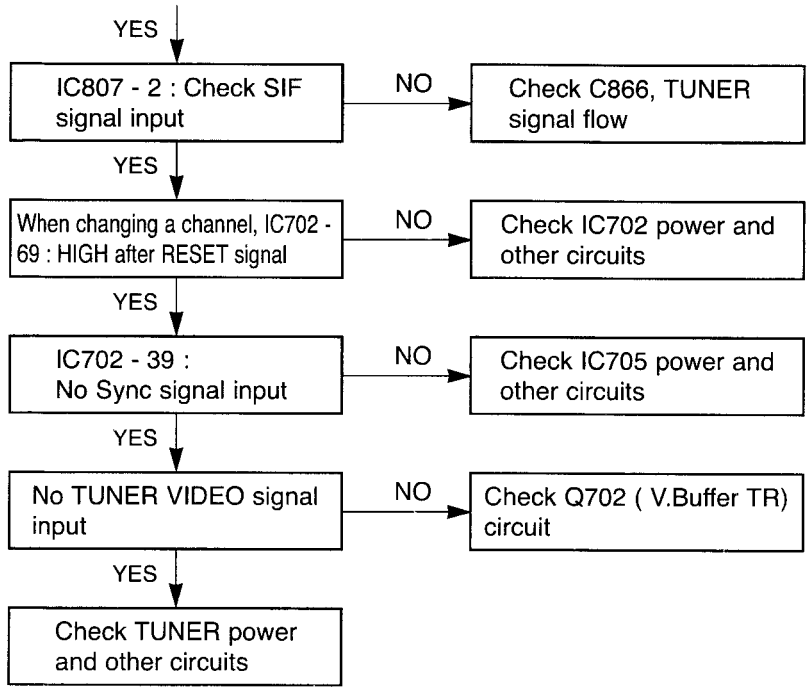


6. No OPTICAL / DIGITAL output

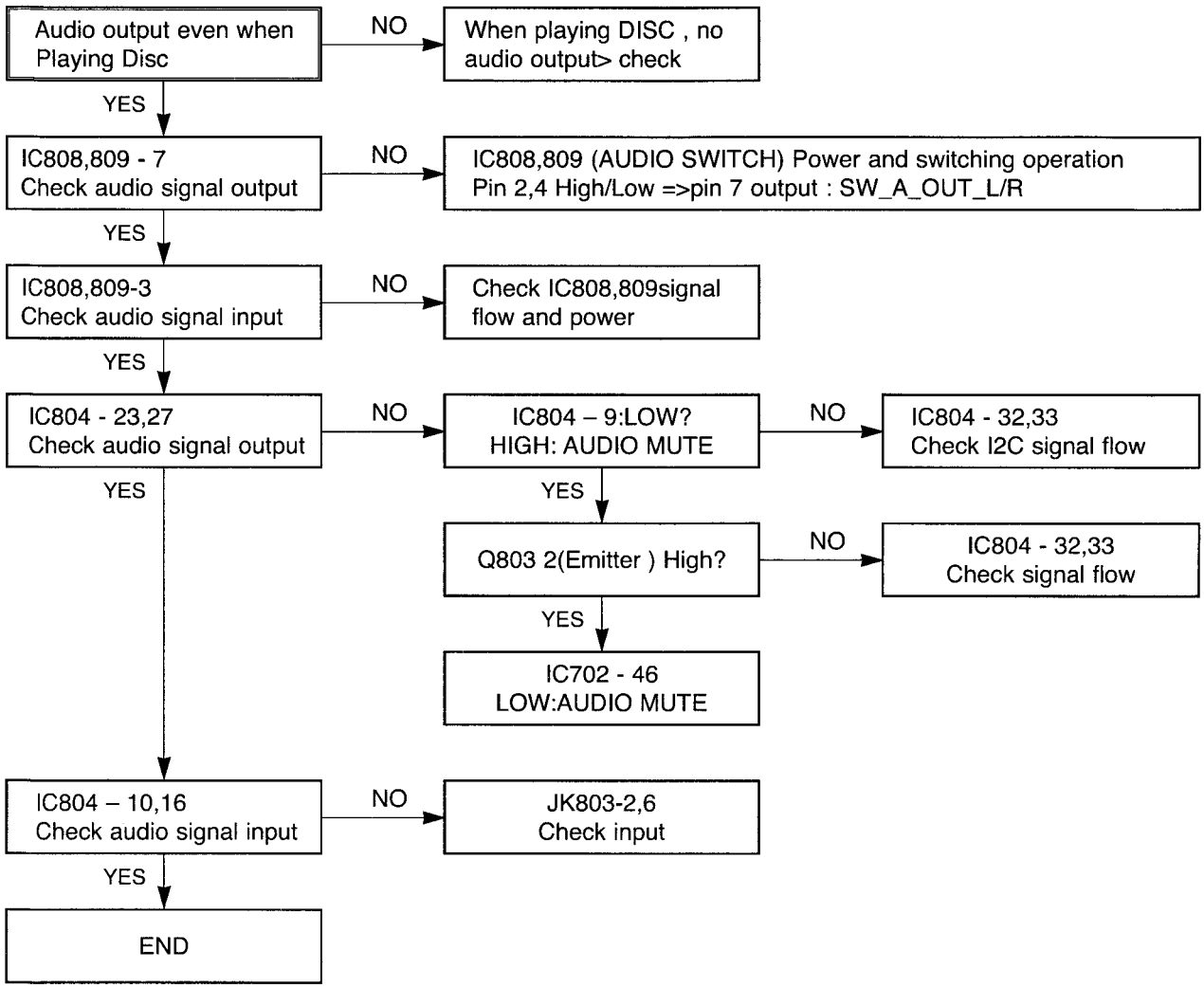


7. No TUNER audio output

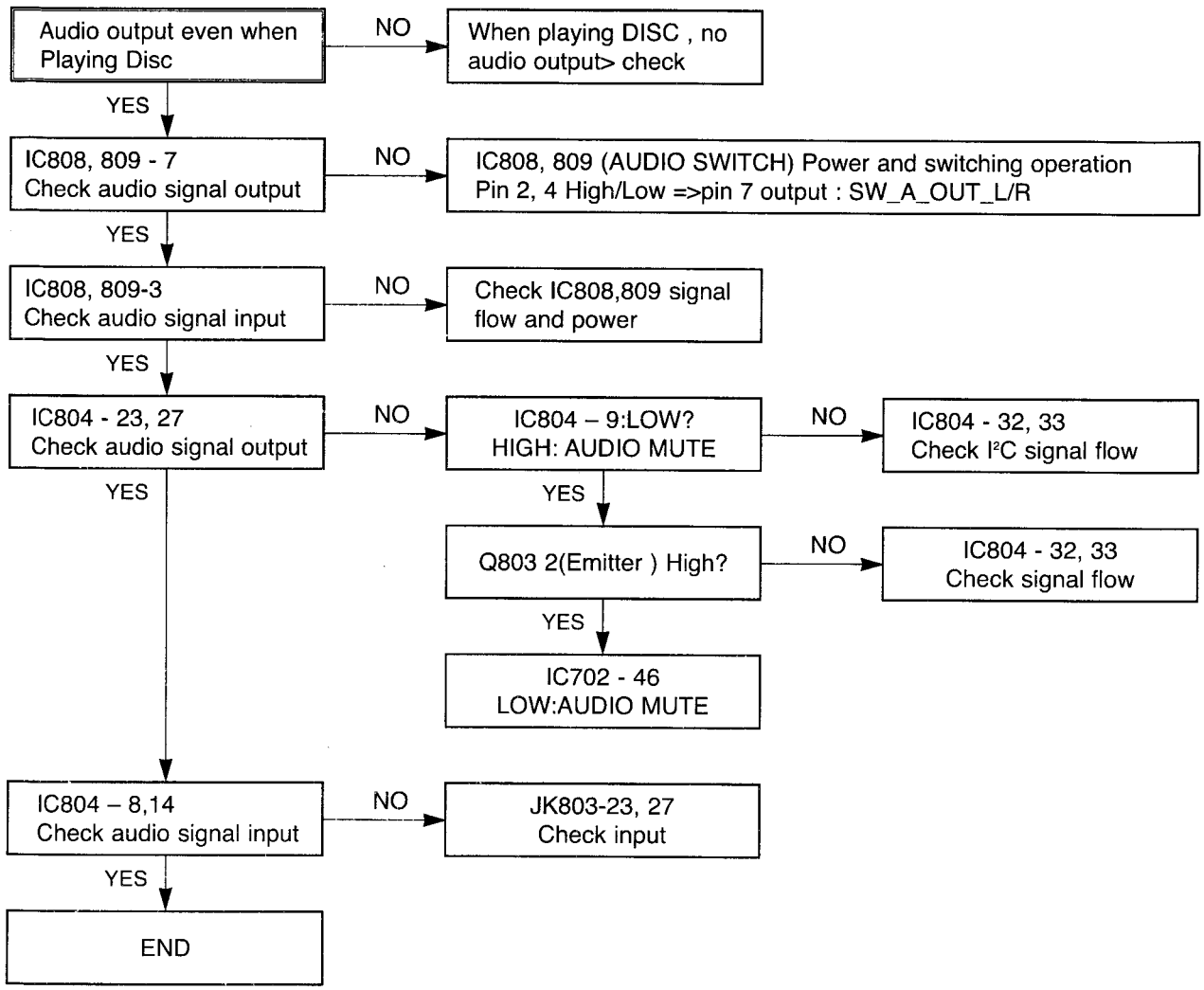



YES
IC807 - 2 : Check SIF signal input
NO
Check C866, TUNER signal flow
YES
When changing a channel, IC702 - 69 : HIGH after RESET signal
NO
Check IC702 power and other circuits
YES
IC702 - 39 : No Sync signal input
NO
Check IC705 power and other circuits
YES
No TUNER VIDEO signal input
NO
Check Q702 (V.Buffer TR) circuit
YES
Check TUNER power and other circuits

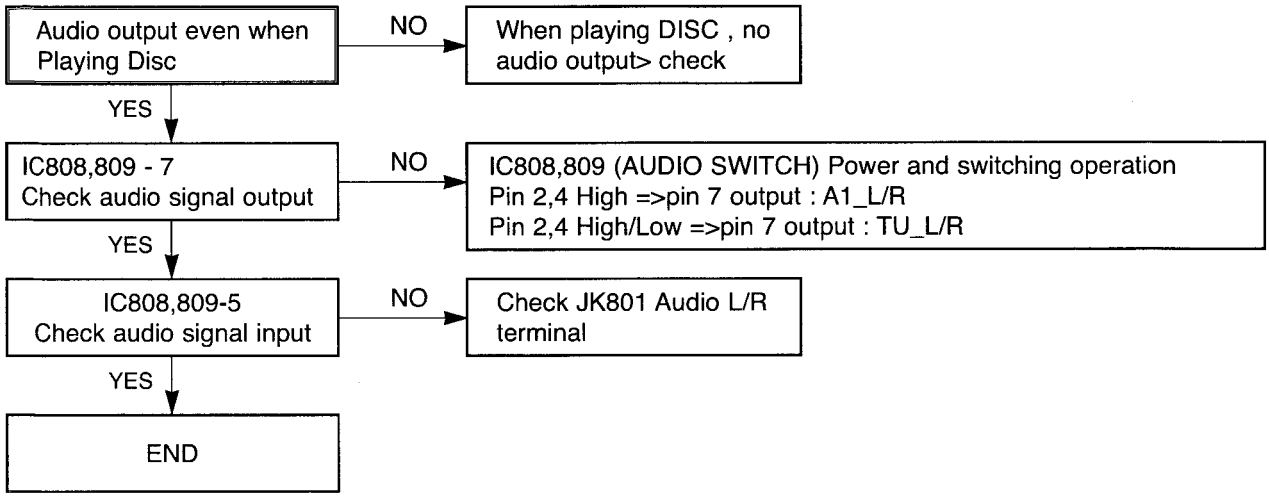
8. No external input 1 audio



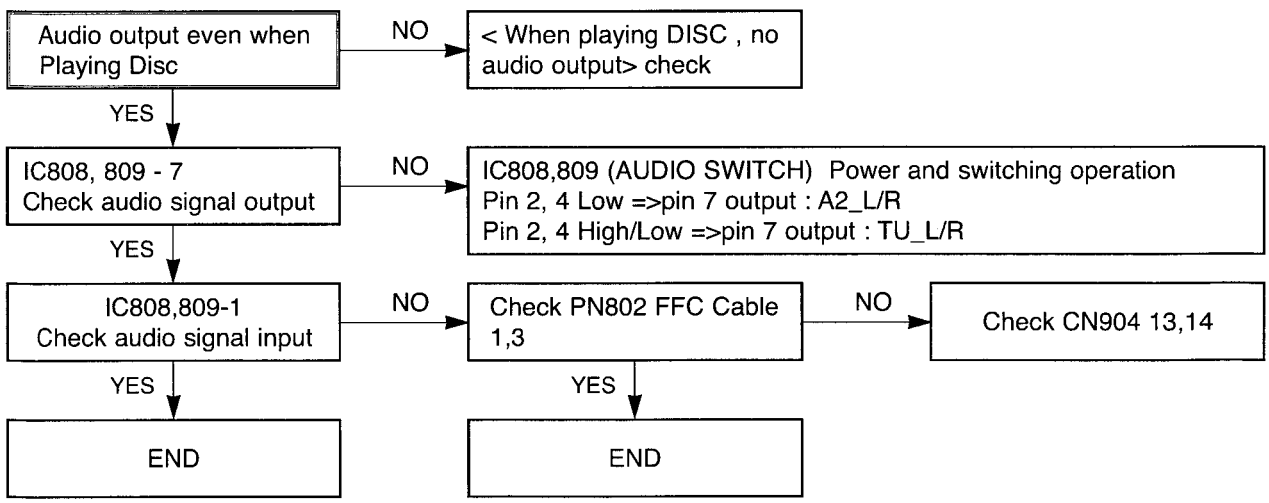
9. No external input 2 audio


Audio output even when Playing Disc
NO
When playing DISC , no audio output> check
YES
IC808, 809 - 7 Check audio signal output
NO
IC808, 809 (AUDIO SWITCH) Power and switching operation Pin 2, 4 High/Low =>pin 7 output : SW_A_OUT_L/R
YES
IC808, 809-3 Check audio signal input
NO
Check IC808,809 signal flow and power
YES
IC804 - 23, 27 Check audio signal output
NO
IC804 – 9:LOW? HIGH: AUDIO MUTE
NO
IC804 - 32, 33 Check I²C signal flow
YES
Q803 2(Emitter) High?
NO
IC804 - 32, 33 Check signal flow
YES
IC702 - 46 LOW:AUDIO MUTE
YES
IC804 – 8,14 Check audio signal input
NO
JK803-23, 27 Check input
YES
END

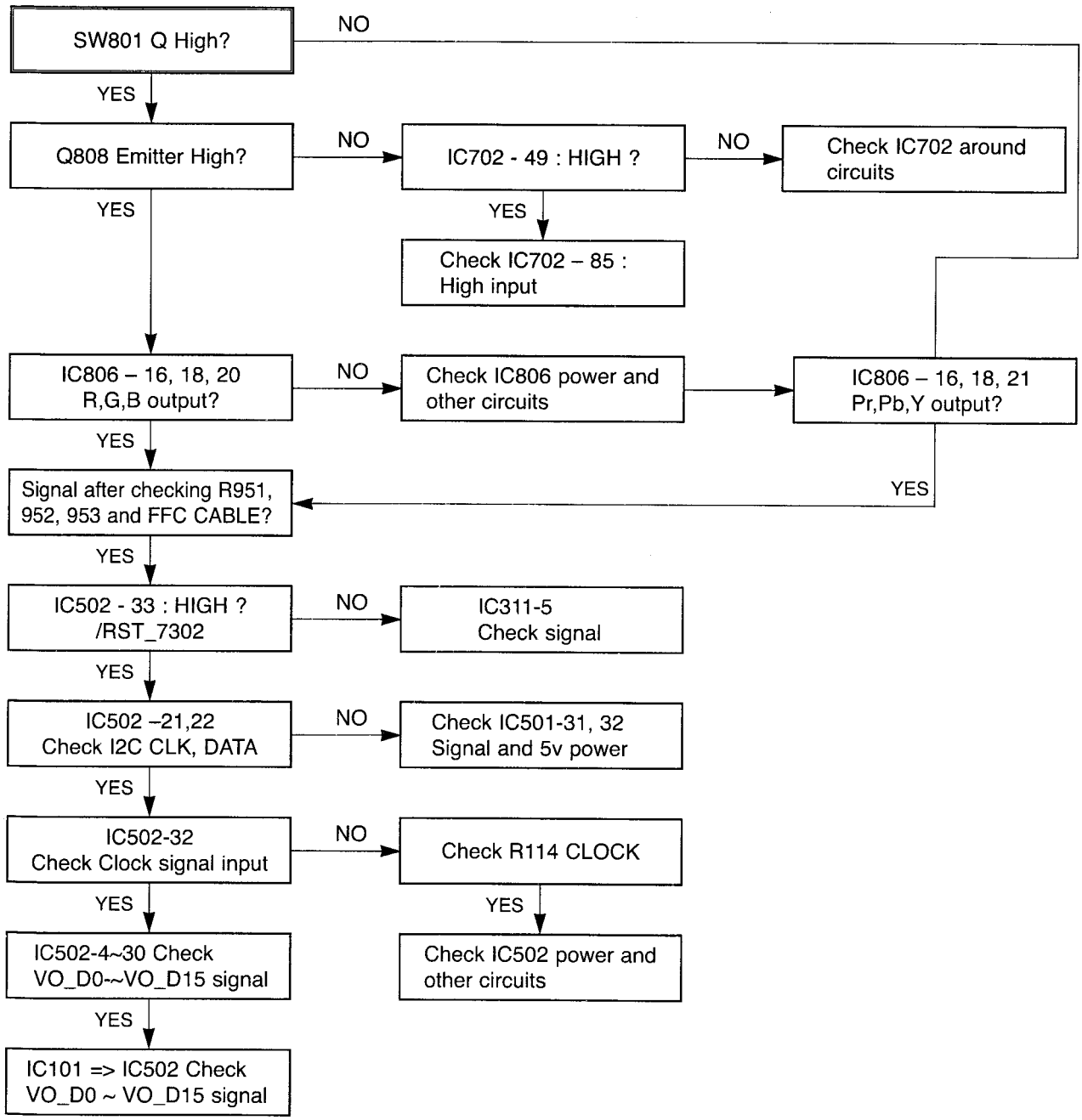
10. No external input 3 audio


Audio output even when Playing Disc
NO
When playing DISC , no audio output> check
YES
IC808,809 - 7 Check audio signal output
NO
IC808,809 (AUDIO SWITCH) Power and switching operation
Pin 2,4 High =>pin 7 output : A1_L/R
Pin 2,4 High/Low =>pin 7 output : TU_L/R
YES
IC808,809-5 Check audio signal input
NO
Check JK801 Audio L/R terminal
YES
END

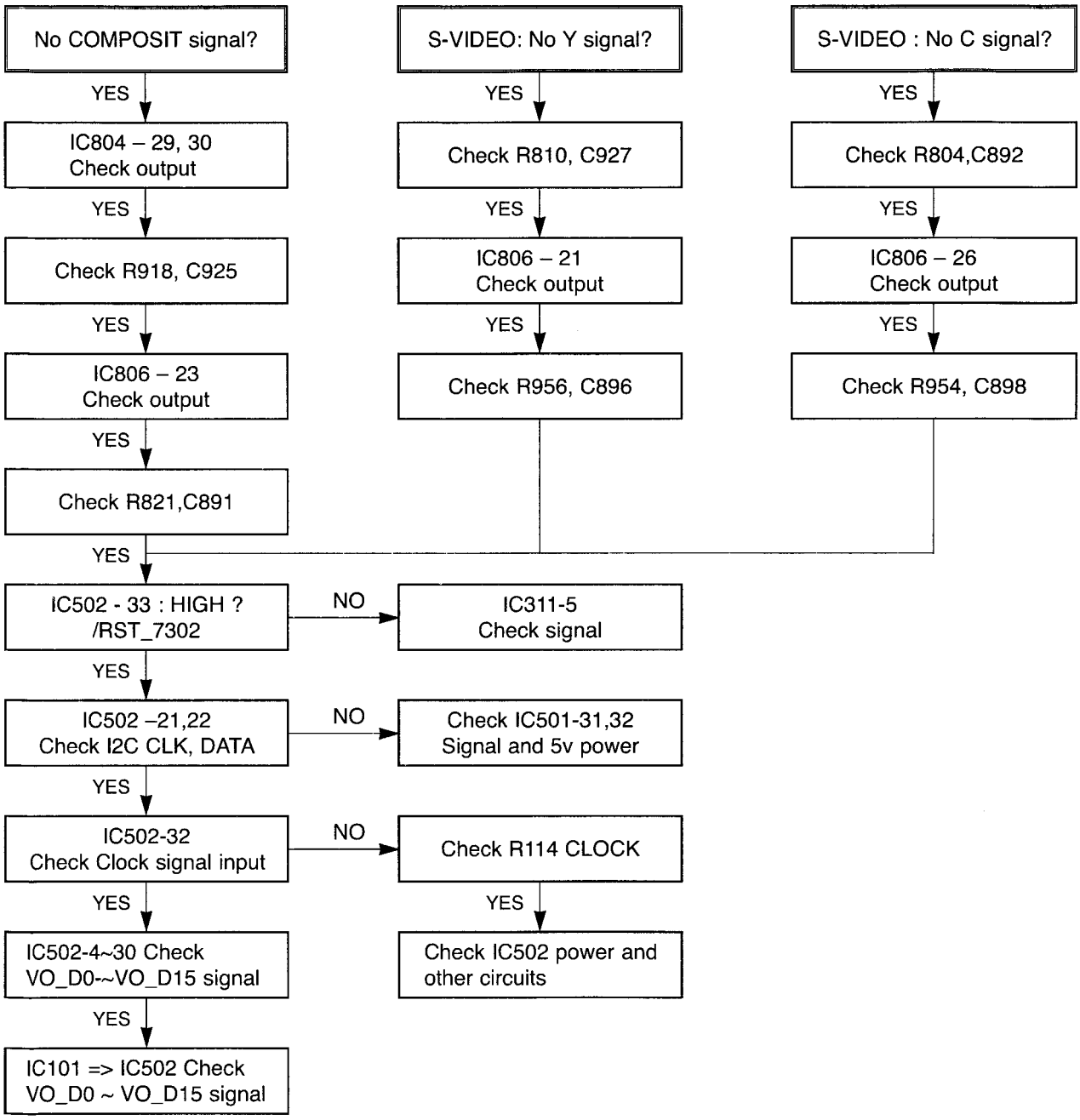
11. No external input 4 audio



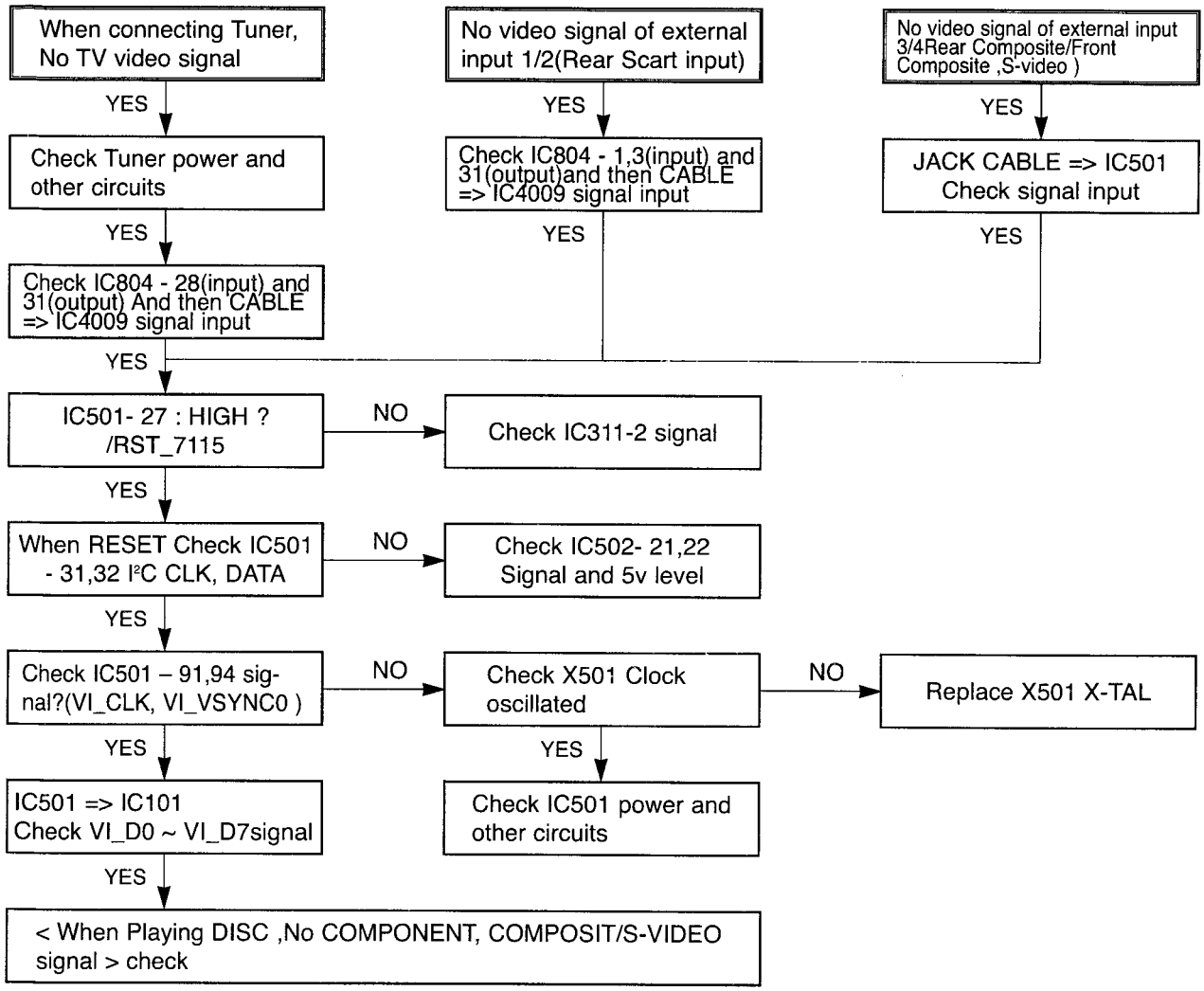
12. No RGB/ Component video signal when playing DISC



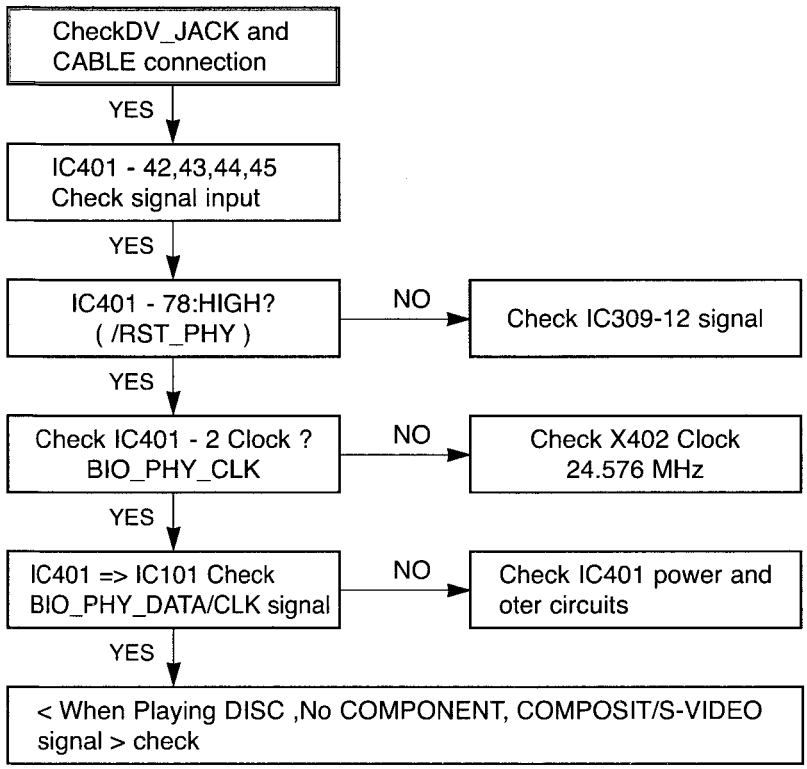
13. No composite/S-Video signal when playing DISC



14. No TV , external input video signal


When connecting Tuner, No TV video signal
YES
Check Tuner power and other circuits
YES
Check IC804 - 28(input) and 31(output) And then CABLE => IC4009 signal input
YES
No video signal of external input 1/2(Rear Scart input)
YES
Check IC804 - 1,3(input) and 31(output)and then CABLE => IC4009 signal input
YES
No video signal of external input 3/4Rear Composite/Front Composite ,S-video)
YES
JACK CABLE => IC501 Check signal input
YES
IC501- 27 : HIGH ? /RST_7115
NO
Check IC311-2 signal
YES
When RESET Check IC501 - 31,32 I²C CLK, DATA
NO
Check IC502- 21,22 Signal and 5v level
YES
Check IC501 – 91,94 signal?(VI_CLK, VI_VSYNC0)
NO
Check X501 Clock oscillated
NO
Replace X501 X-TAL
YES
IC501 => IC101 Check VI_D0 ~ VI_D7signal
YES
Check IC501 power and other circuits
YES
< When Playing DISC ,No COMPONENT, COMPOSIT/S-VIDEO signal > check

15. No DV(IEEE 1394) input (video/audio) signal



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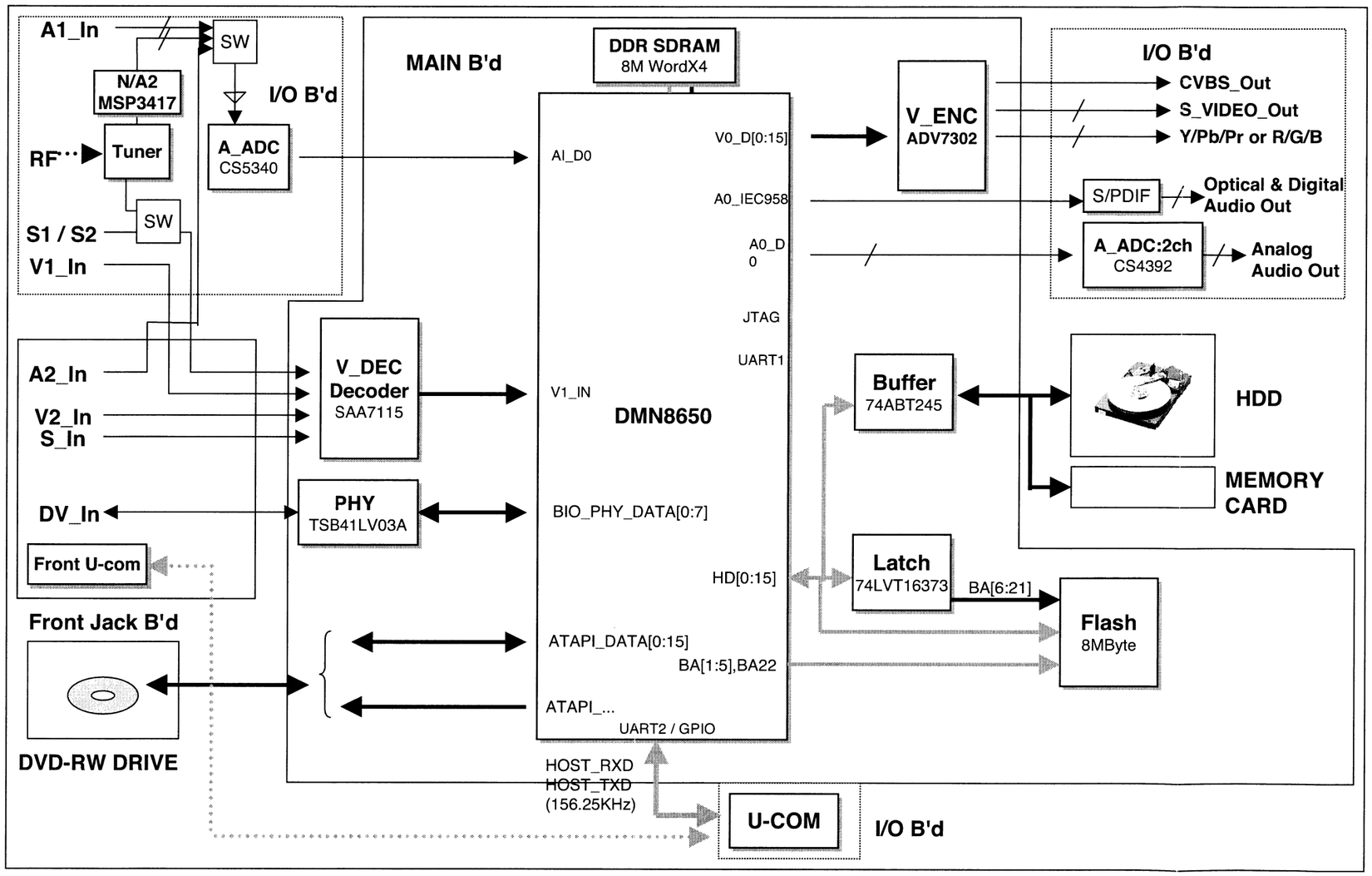
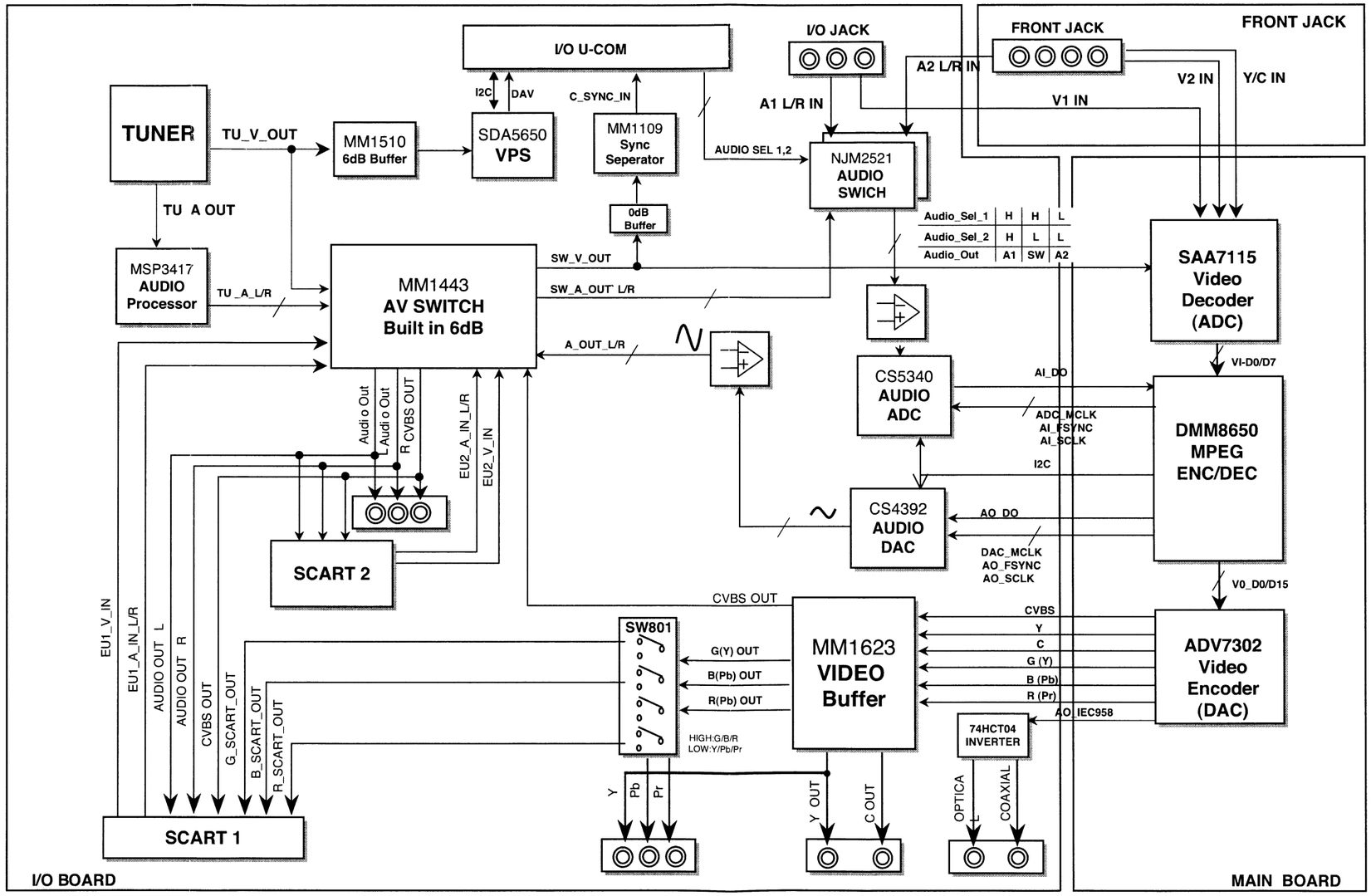
BLOCK DIAGRAMS

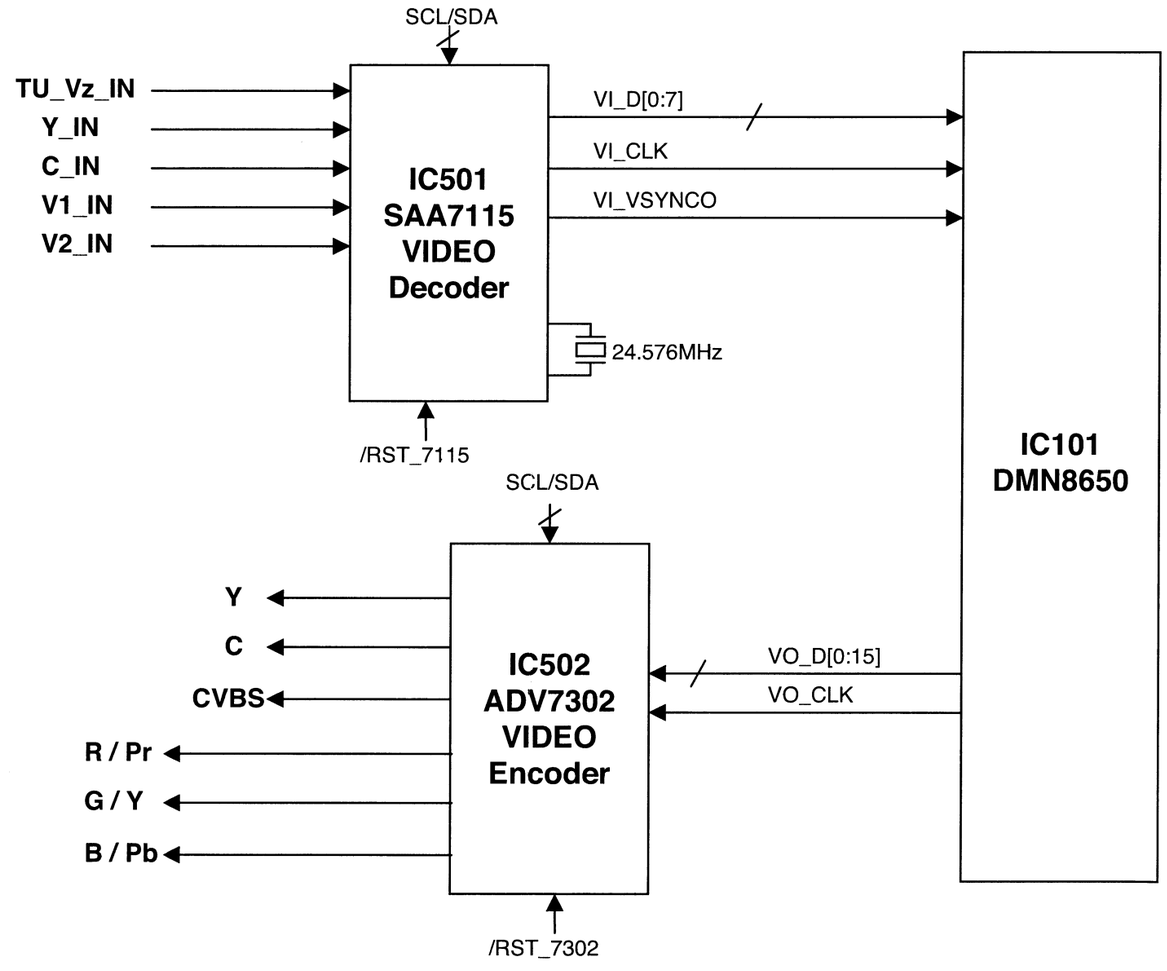
1. Overall Block Diagram



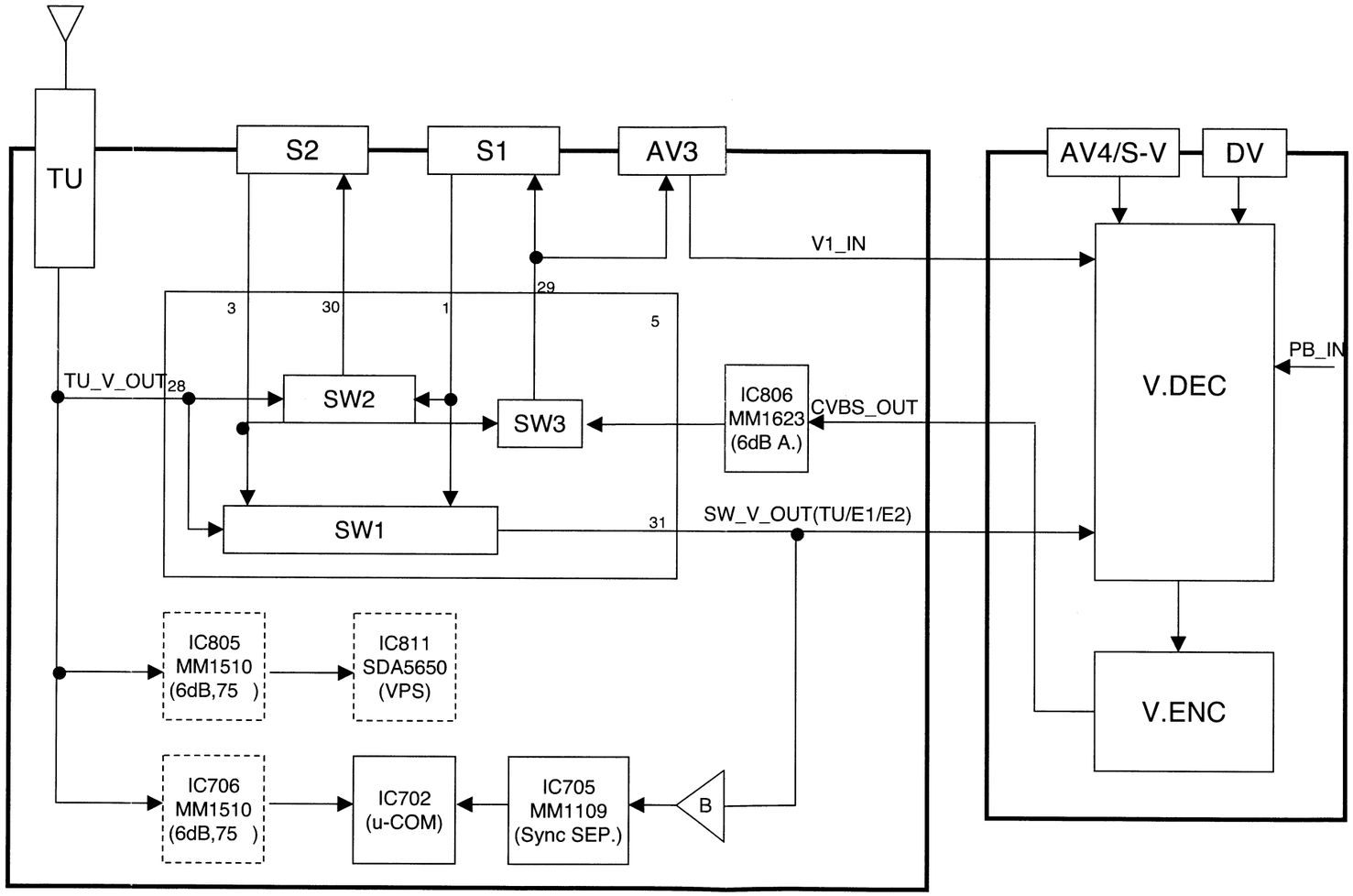
2. In/Out Block Diagram



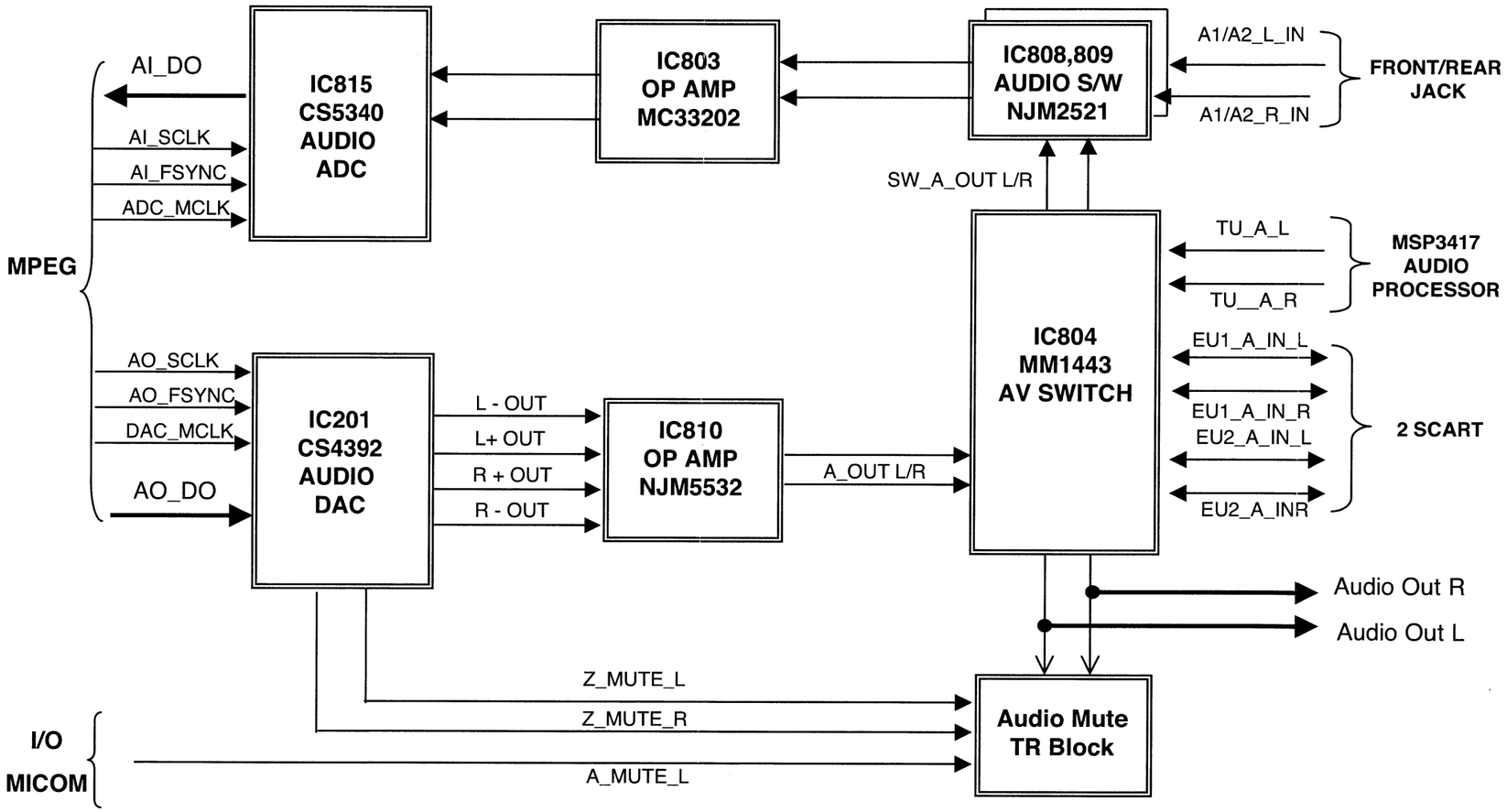
3. Video Block Diagram



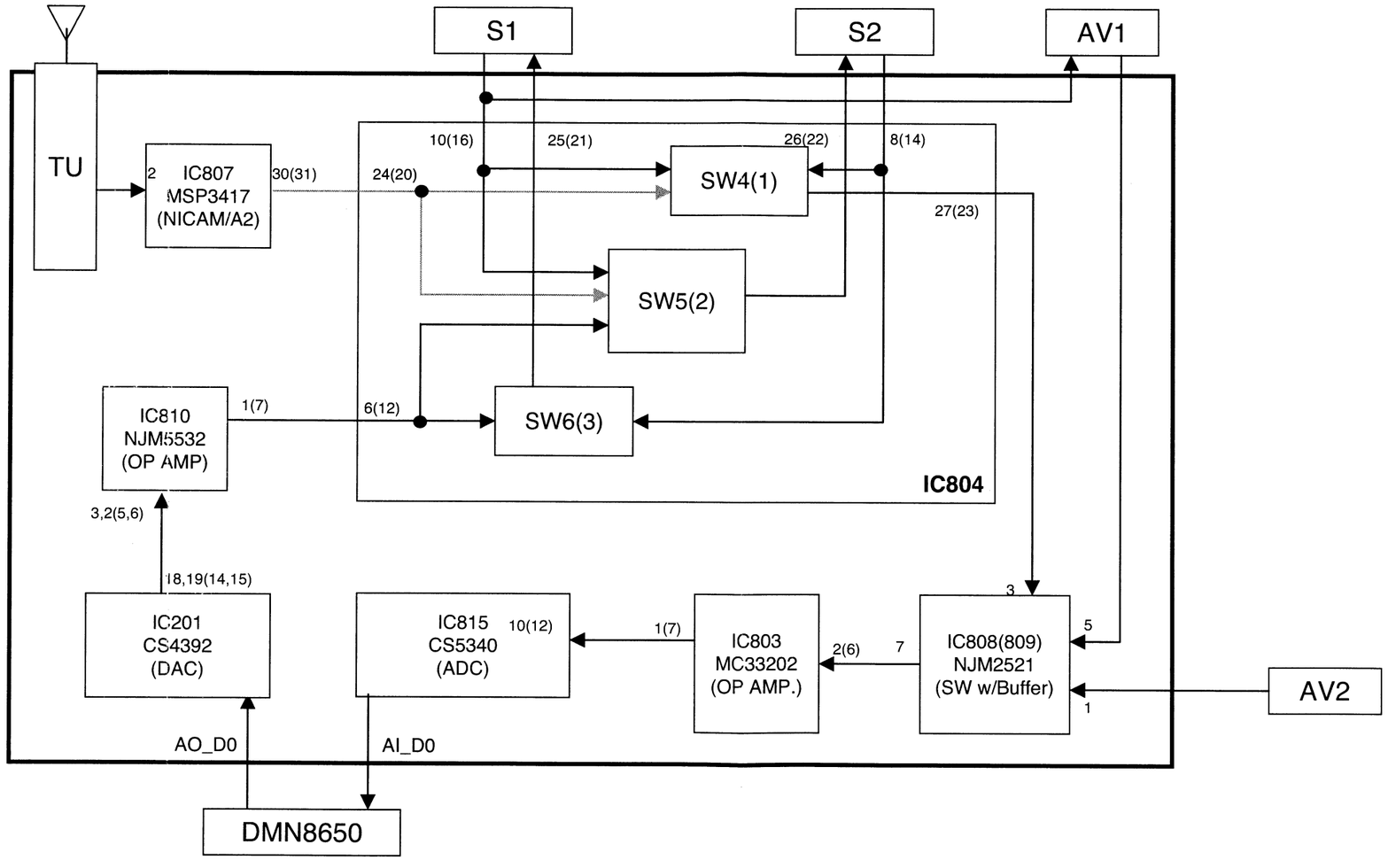
4. Video SW Path Block Diagram



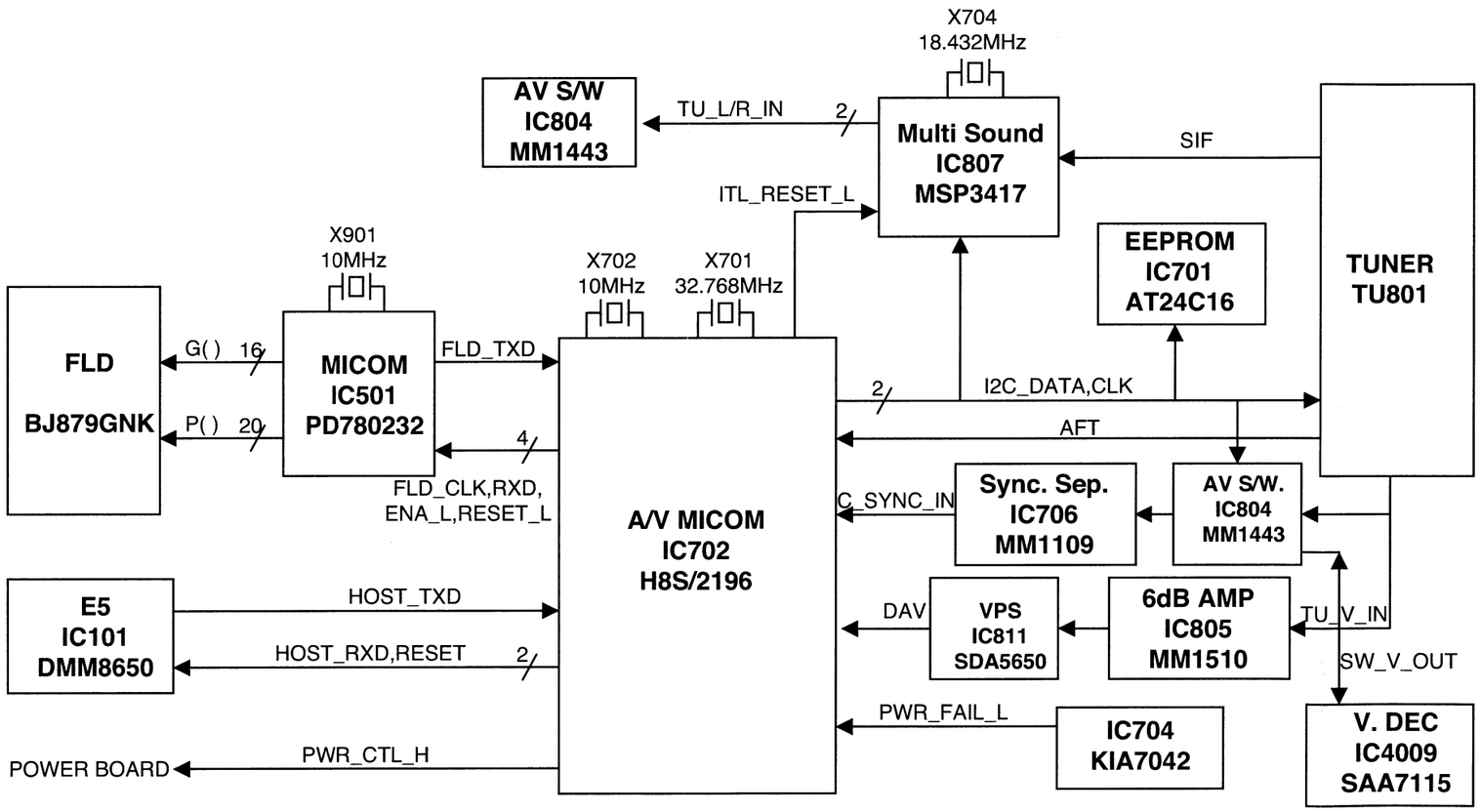
5. Audio Block Diagram



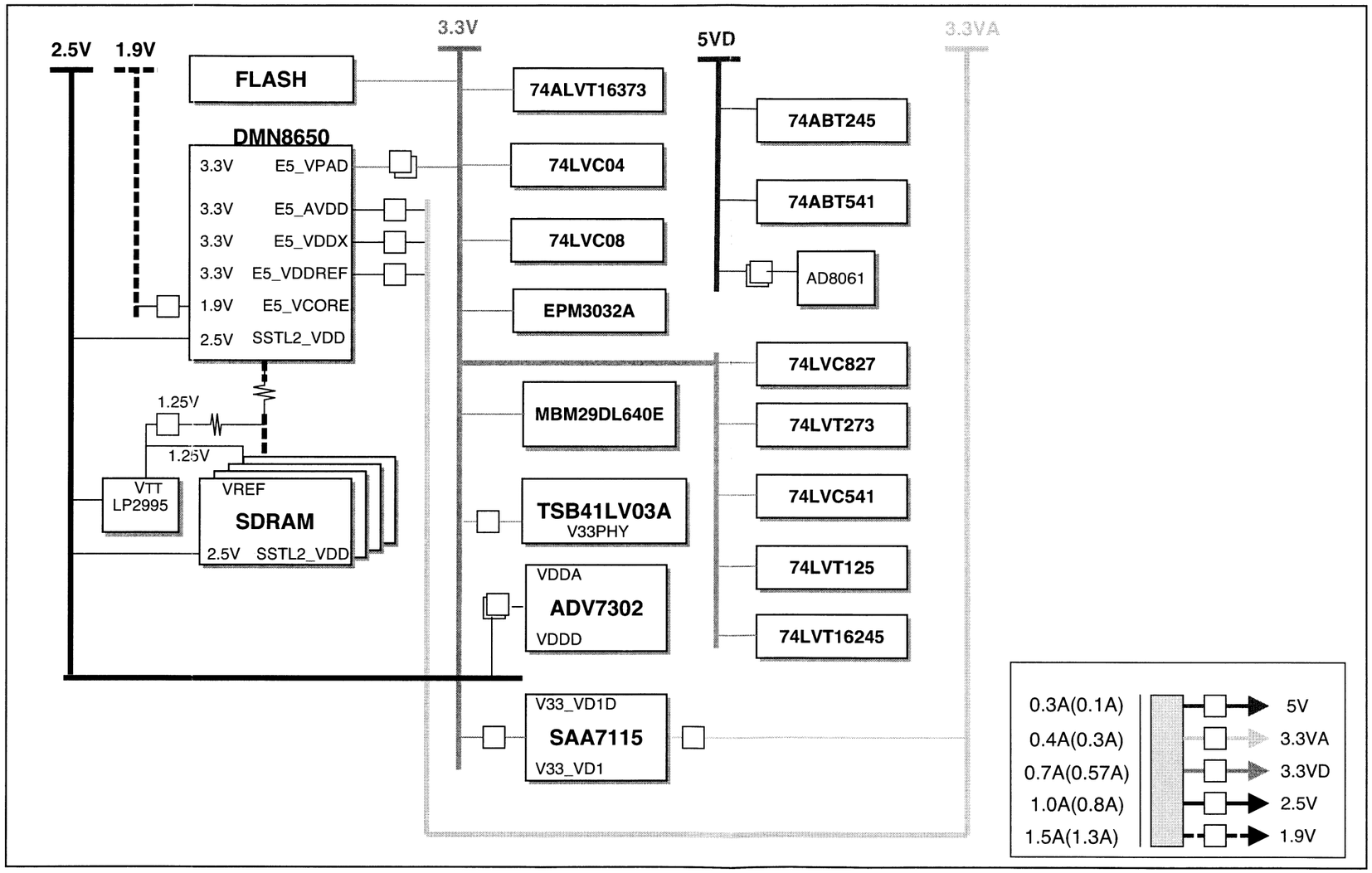
6. Audio SW Path Block Diagram



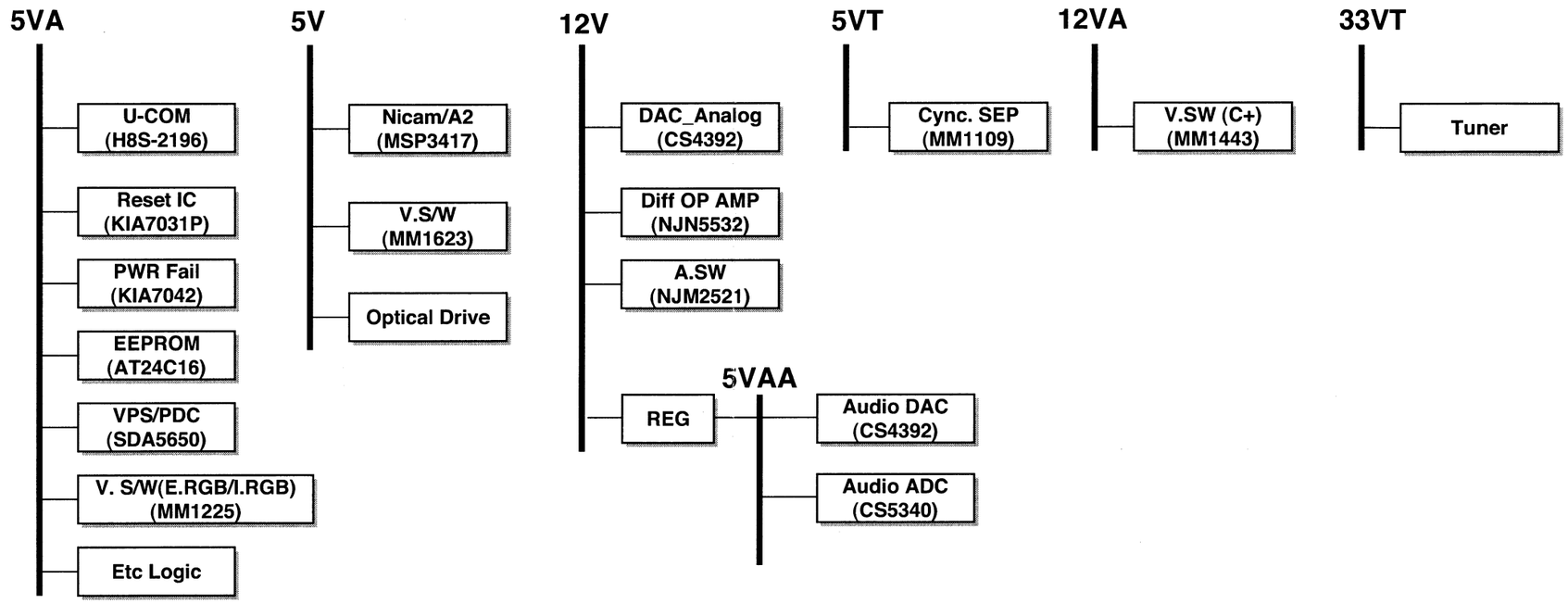
7. FLD / μ-COM Block Diagram



8. Power : Main Board Block Diagram

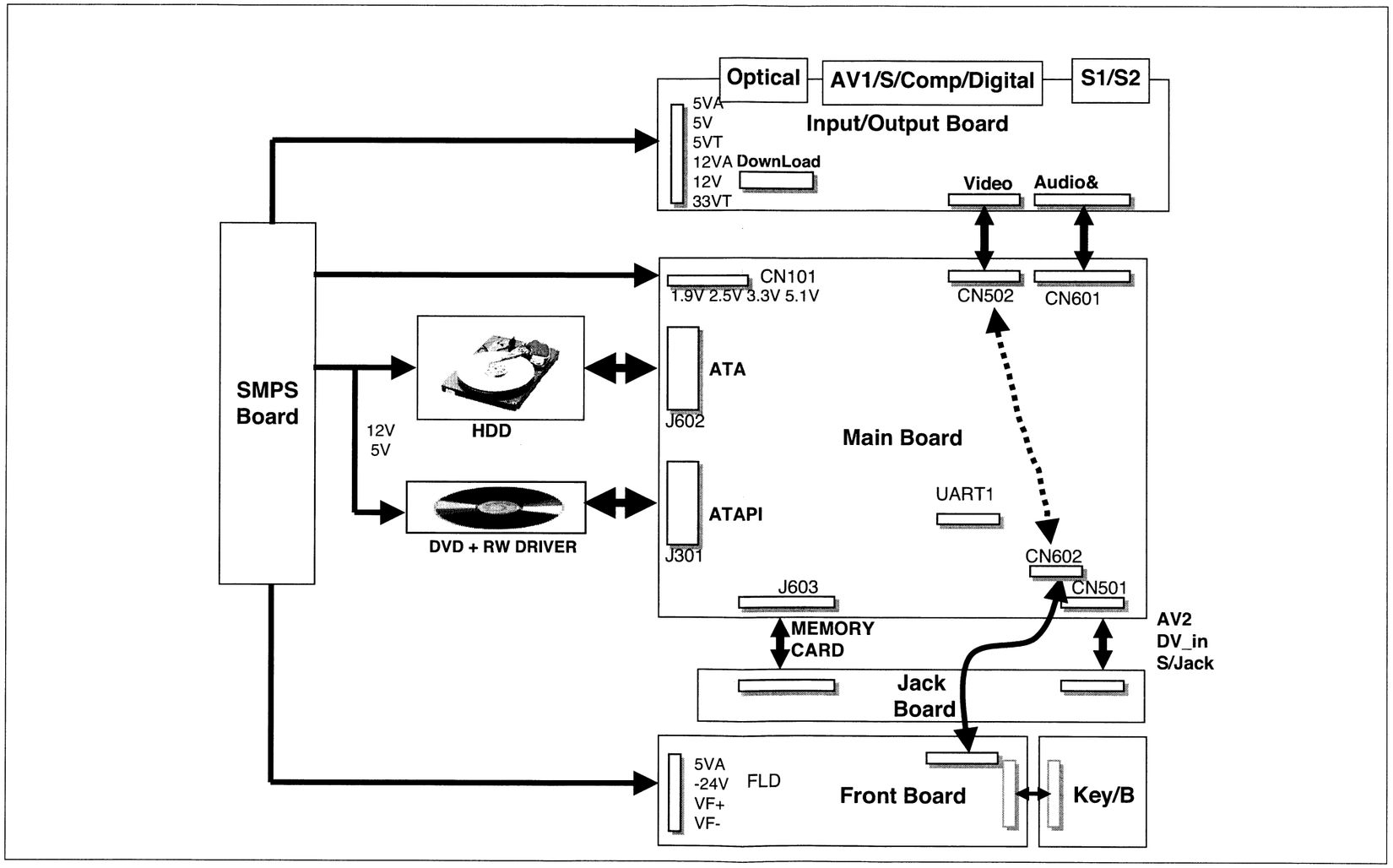


9. Power : I/O Board Block Diagram

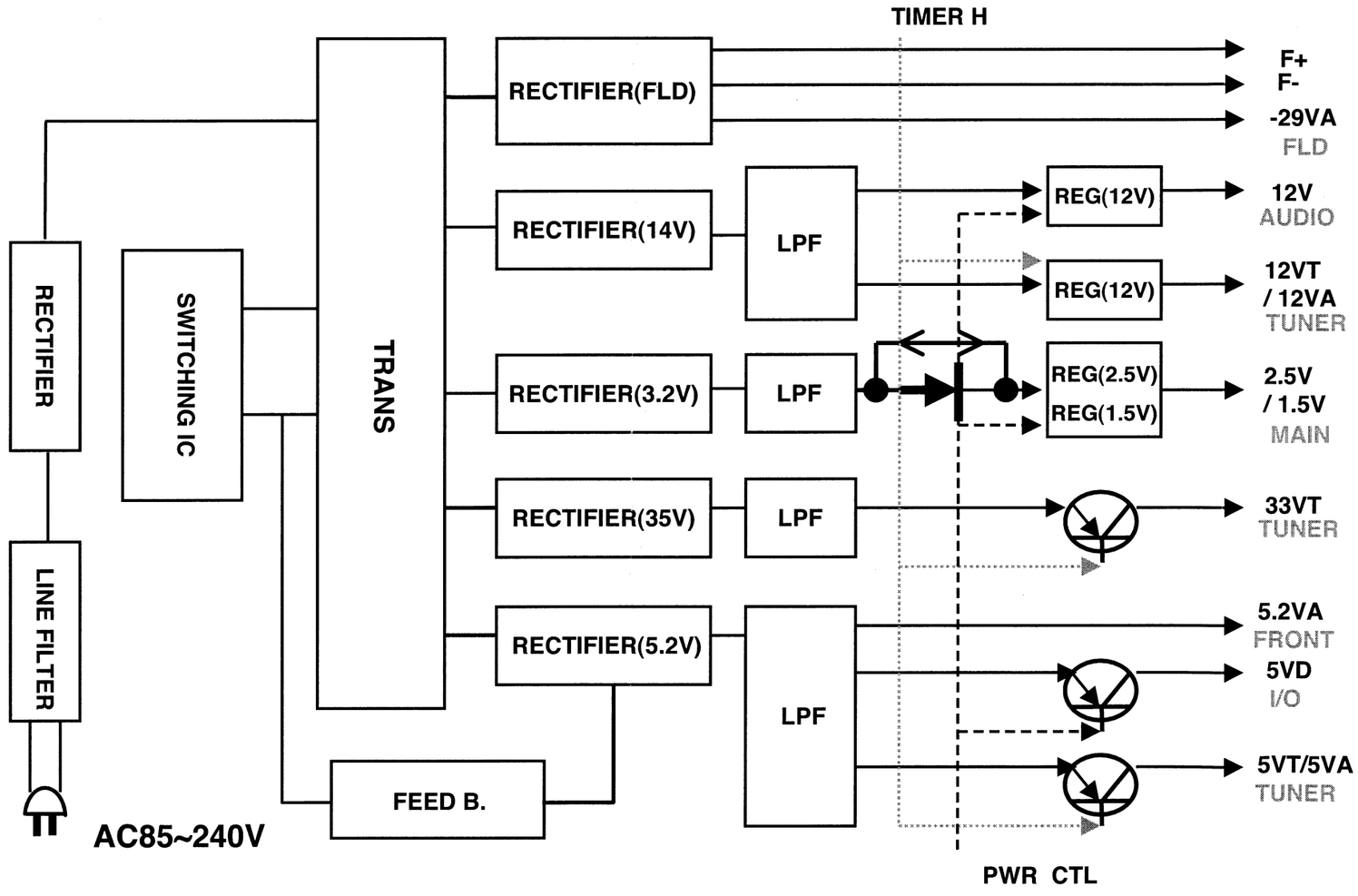


I/O Ucom PWR CTL	
PWR_CTL_H	5V, 12V CONTROL
TIMER_H	5VT, 33VT

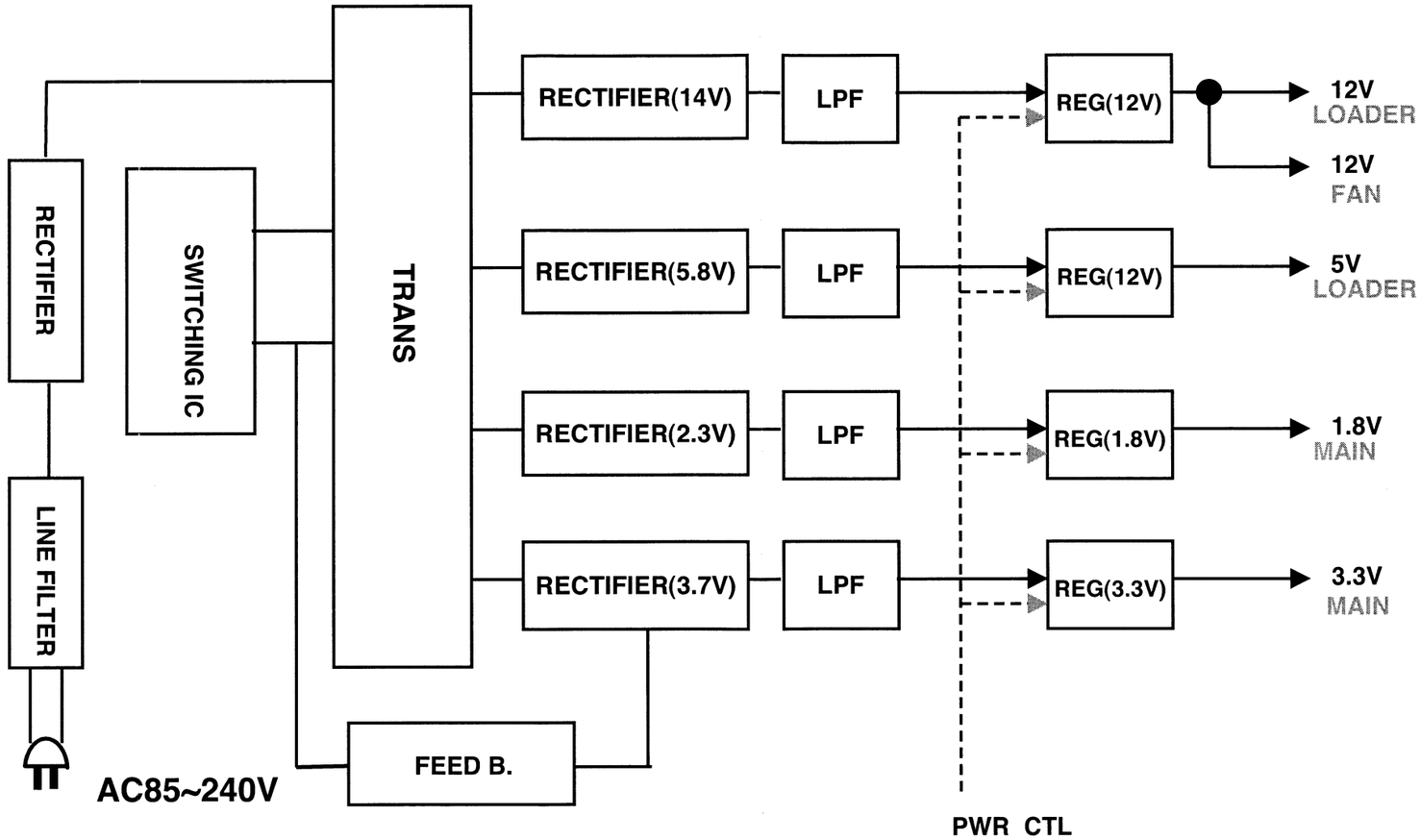
10. Layout Connection Block Diagram



11. SMPS Block Diagram (PART 1)

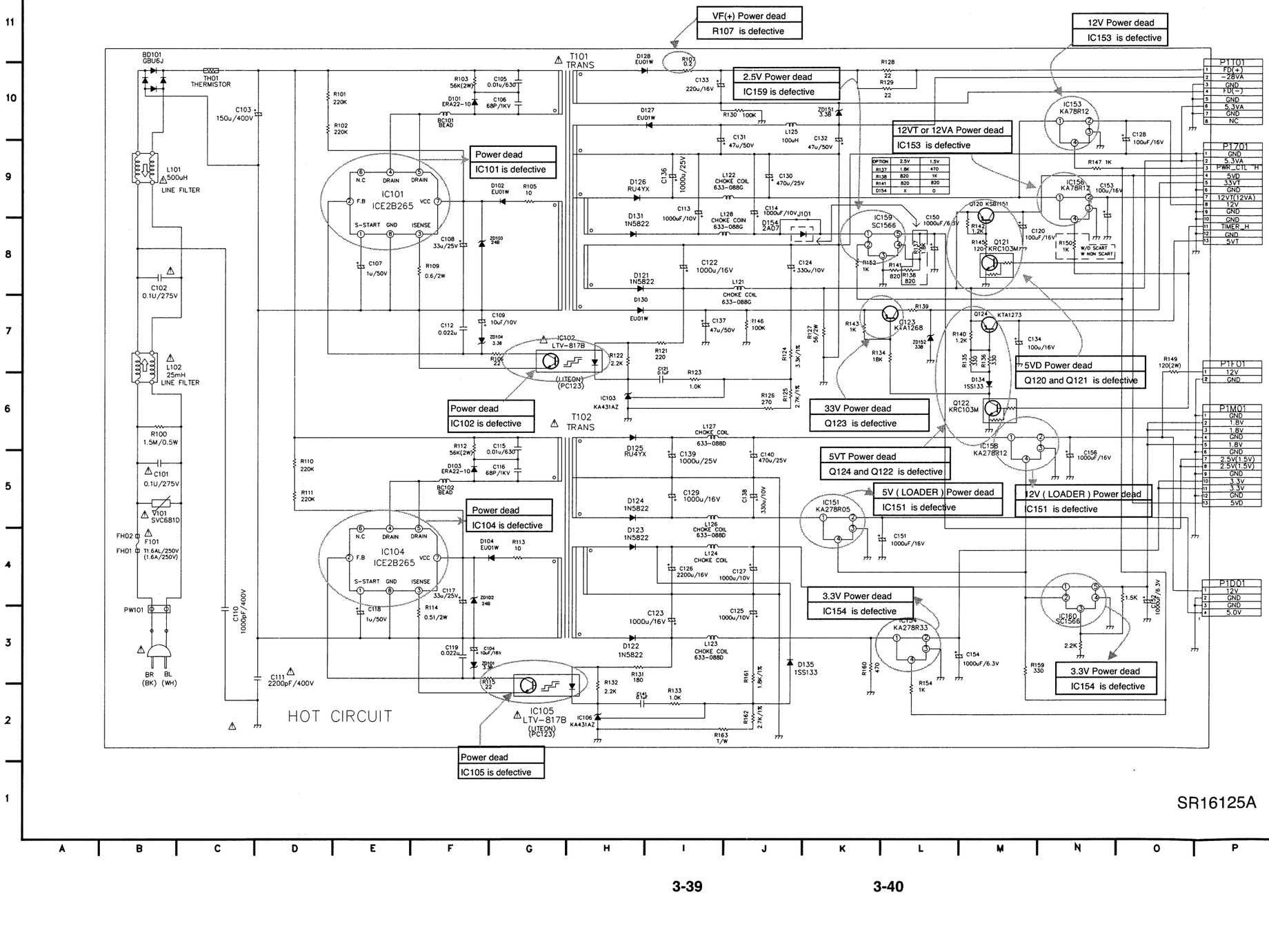


12. SMPS Block Diagram (PART 2)

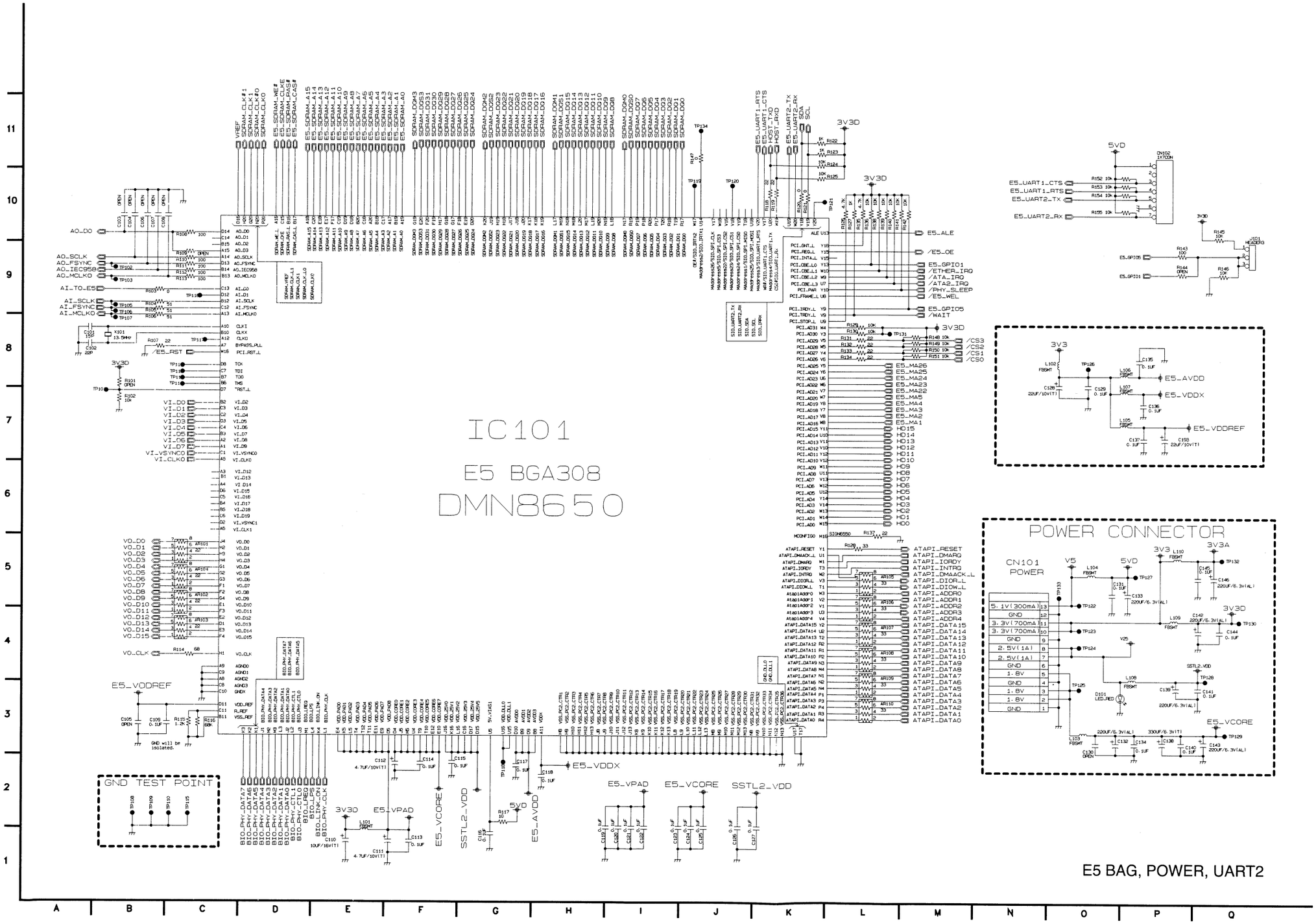


CIRCUIT DIAGRAMS

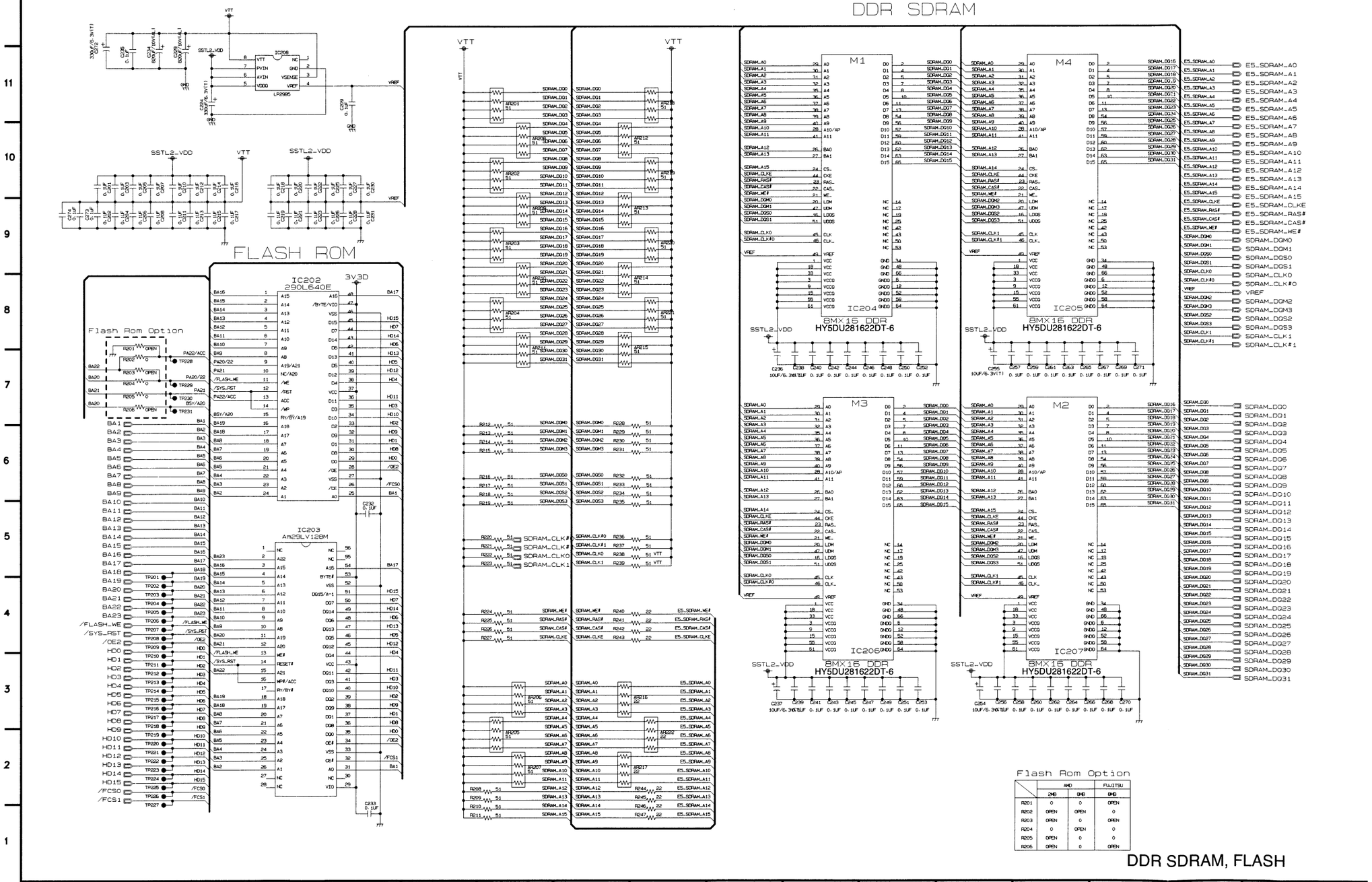
1. POWER CIRCUIT DIAGRAM



2. E5 BGA, POWER, UART2 CIRCUIT DIAGRAM

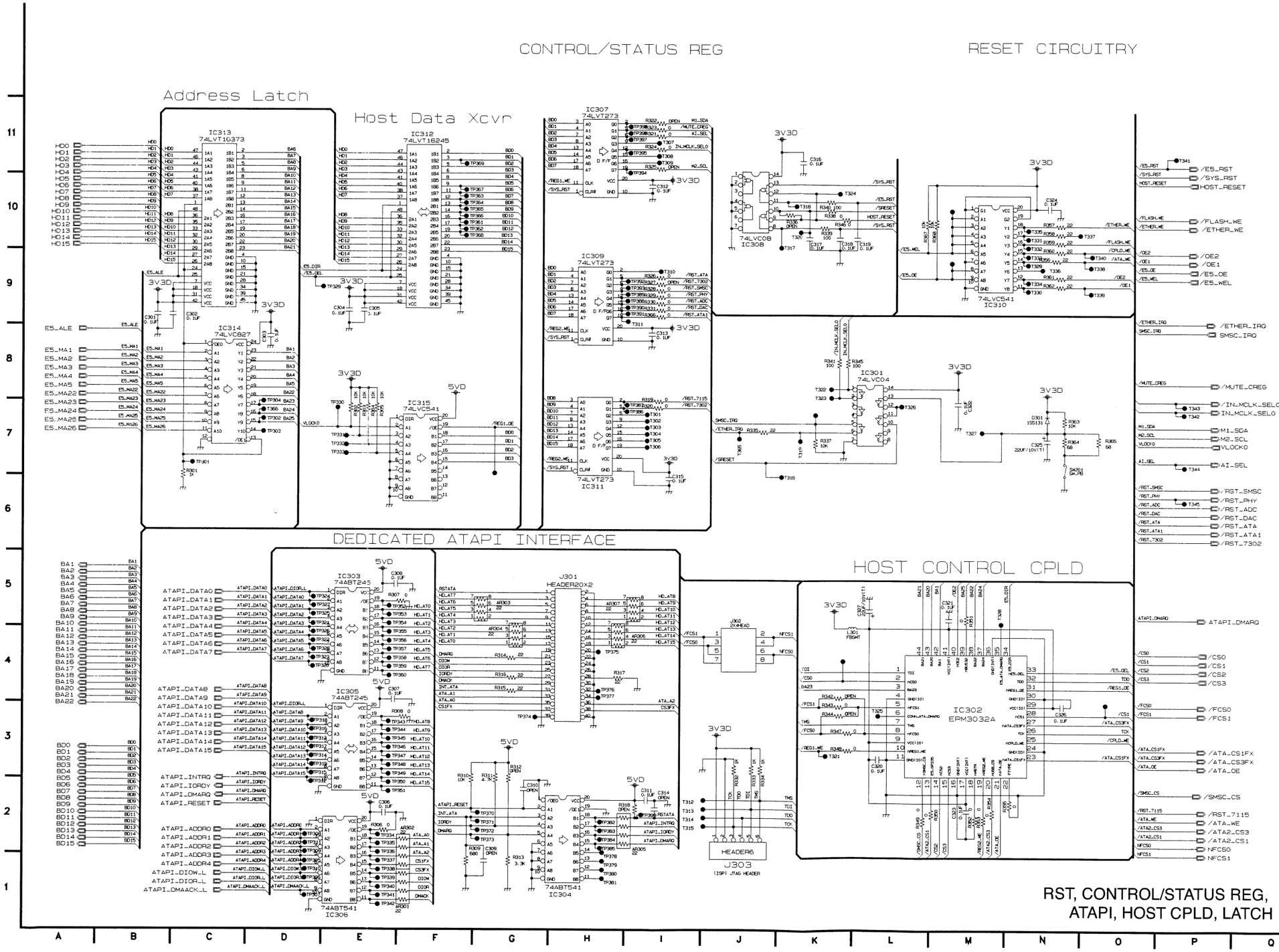


3. DDR SDRAM, FLASH CIRCUIT DIAGRAM



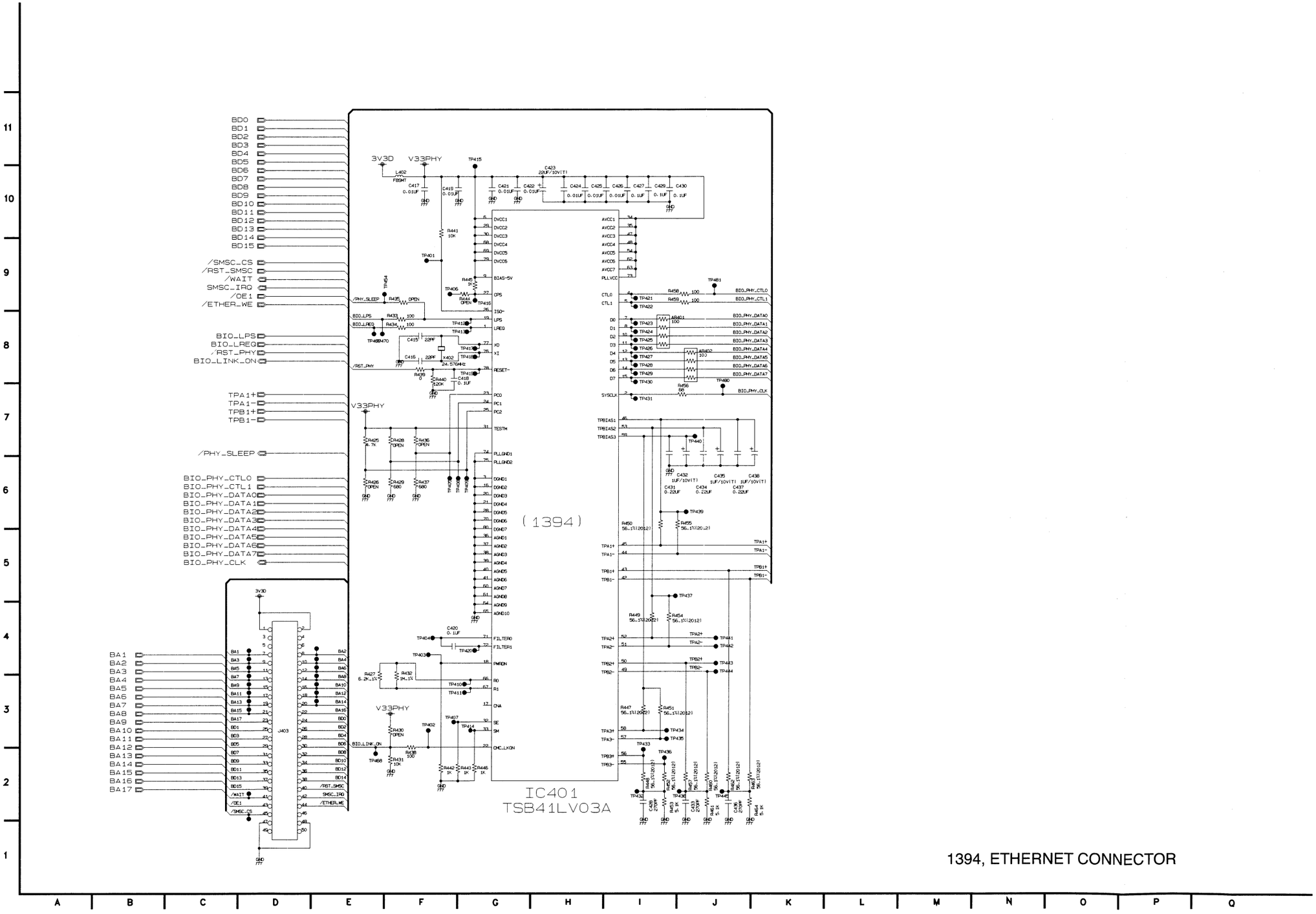
	AMD		FUJITSU
	2MB	8MB	8MB
R201	0	0	OPEN
R202	OPEN	OPEN	0
R203	OPEN	0	OPEN
R204	0	OPEN	0
R205	OPEN	0	0
R206	OPEN	0	OPEN

4. RST, CONTROL/STATUS REG, ATAPI, HOST CPLD, LATCH CIRCUIT DIAGRAM

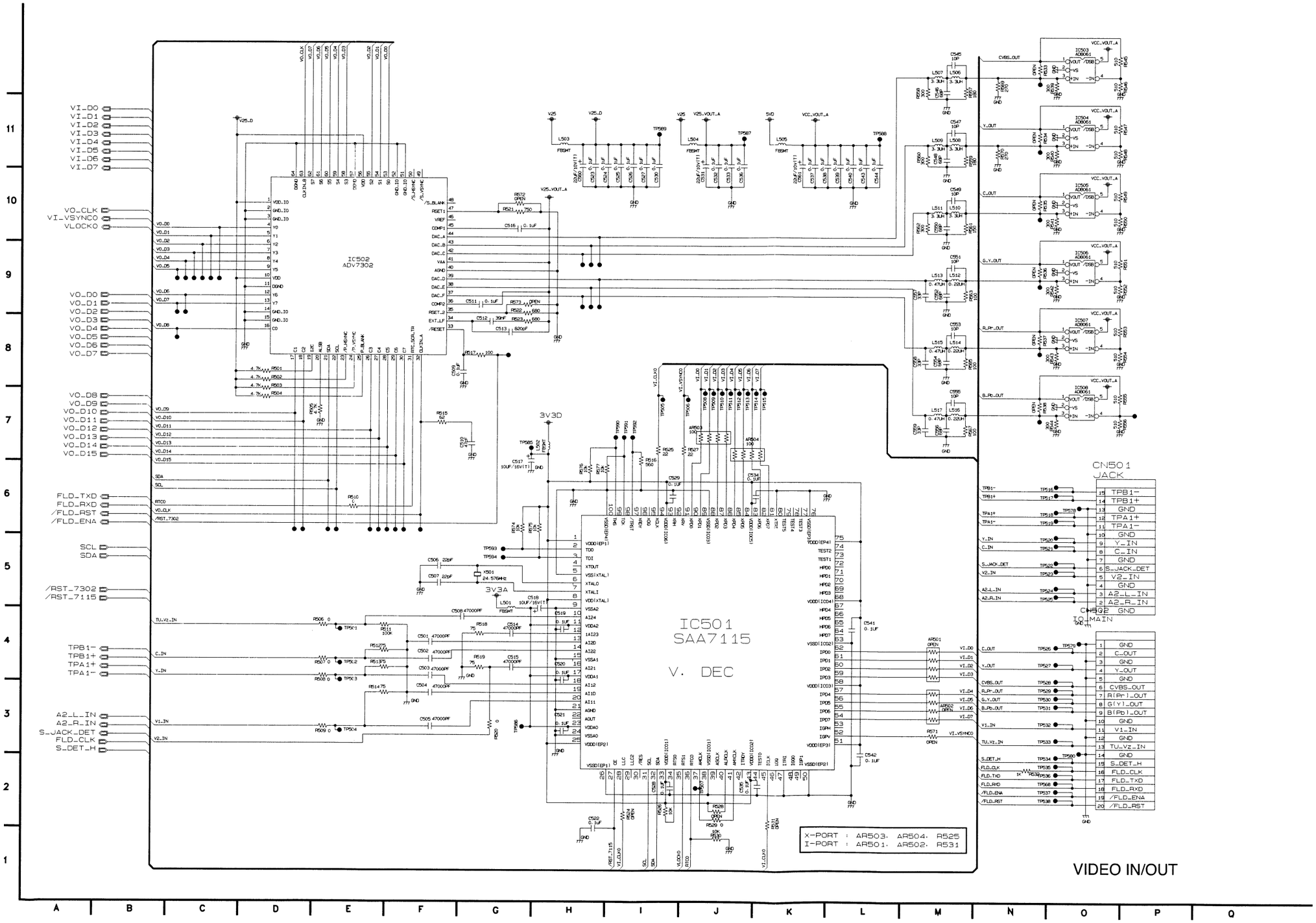


RST, CONTROL/STATUS REG,
ATAPI, HOST CPLD, LATCH

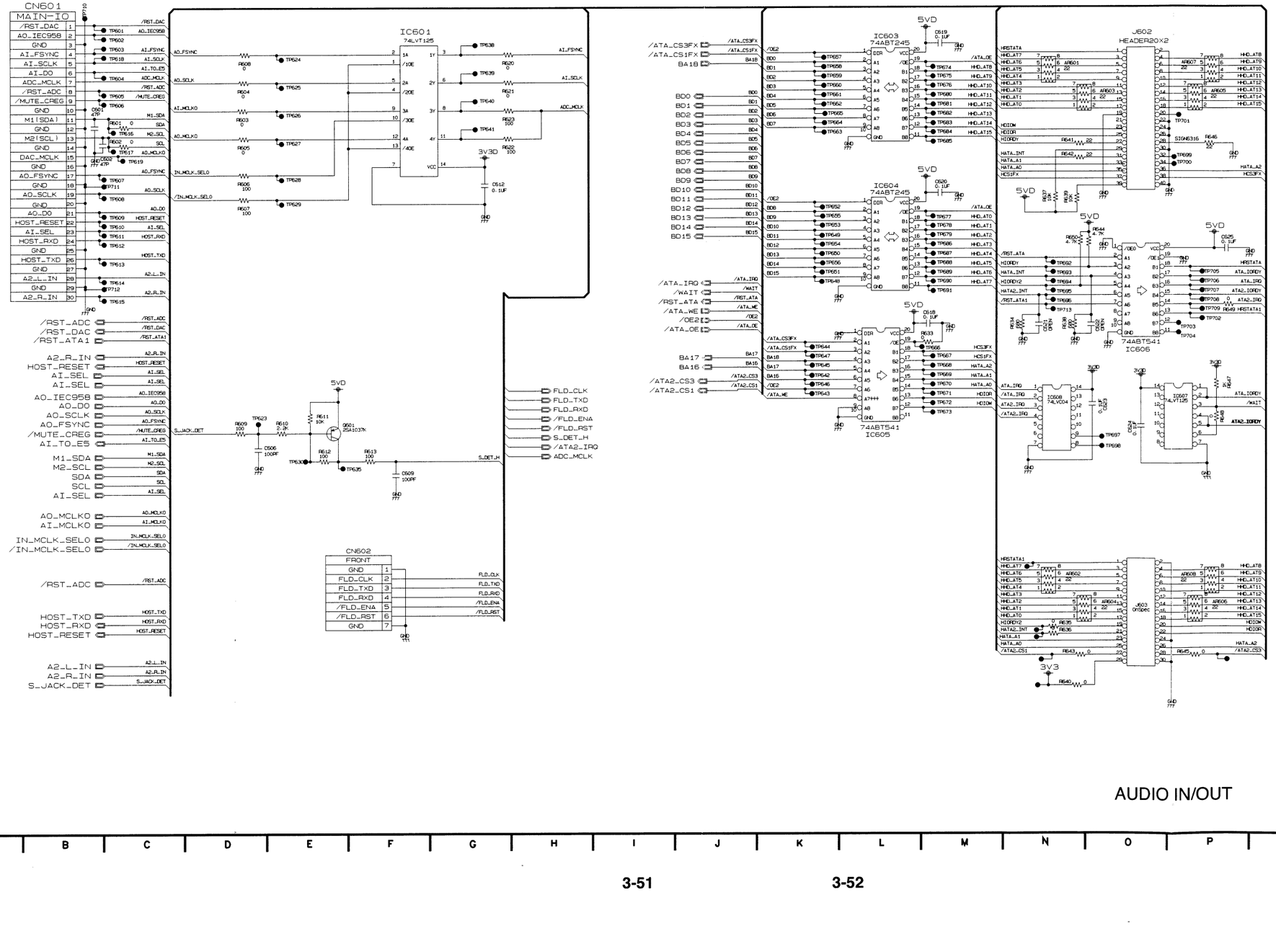
5. 1394, ETHERNET CONNECTOR CIRCUIT DIAGRAM



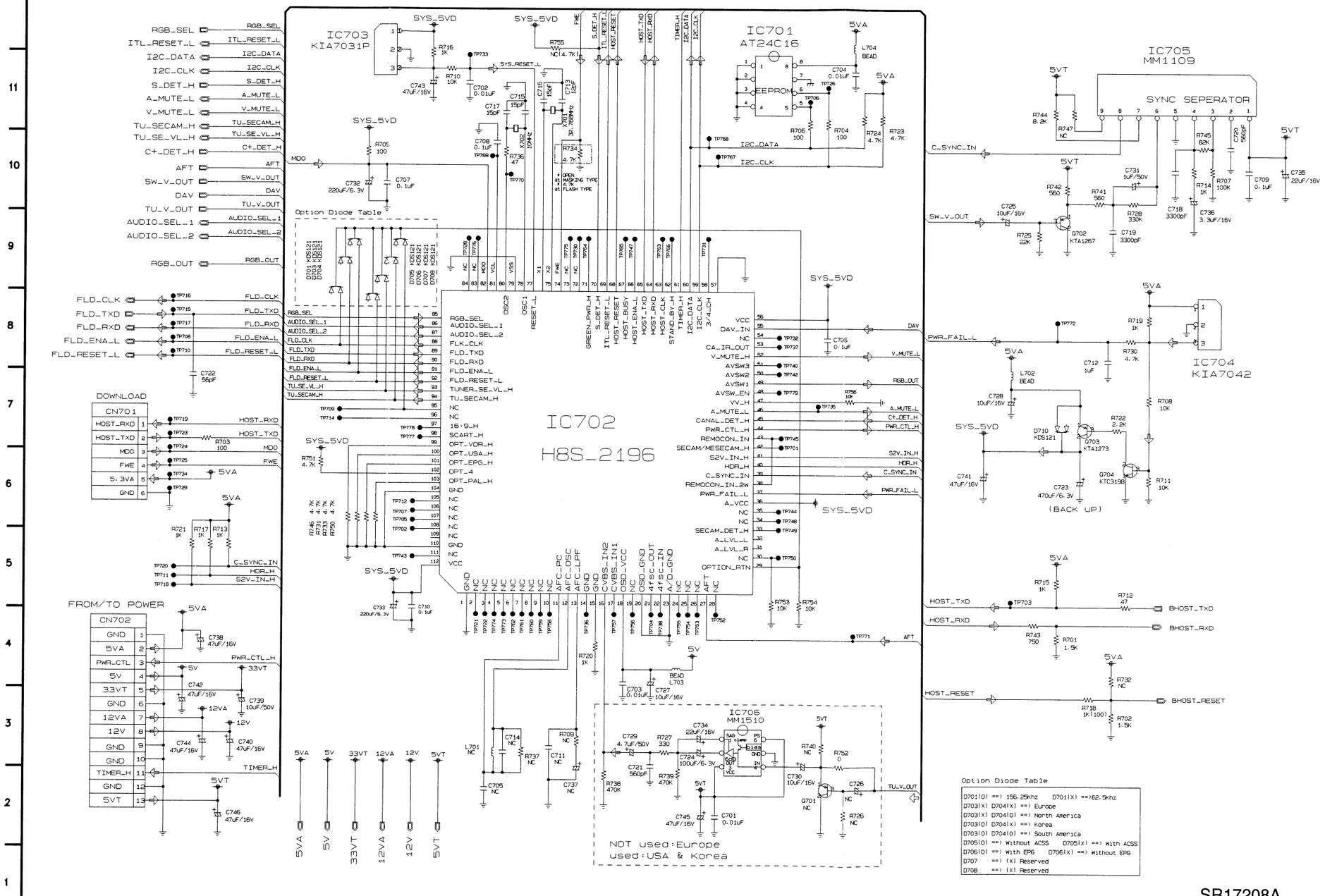
6. VIDEO IN/OUT CIRCUIT DIAGRAM



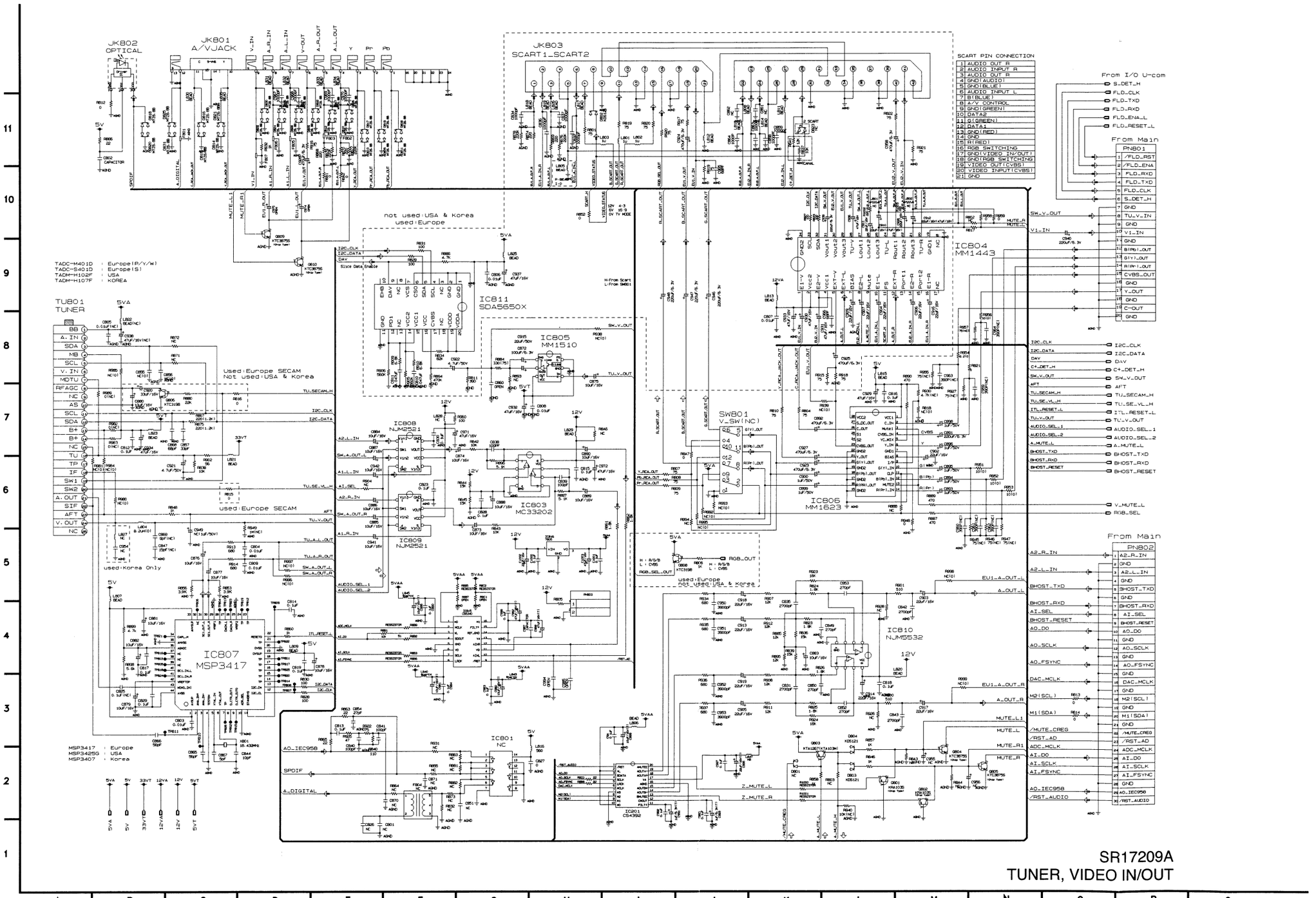
7. AUDIO IN/OUT CIRCUIT DIAGRAM



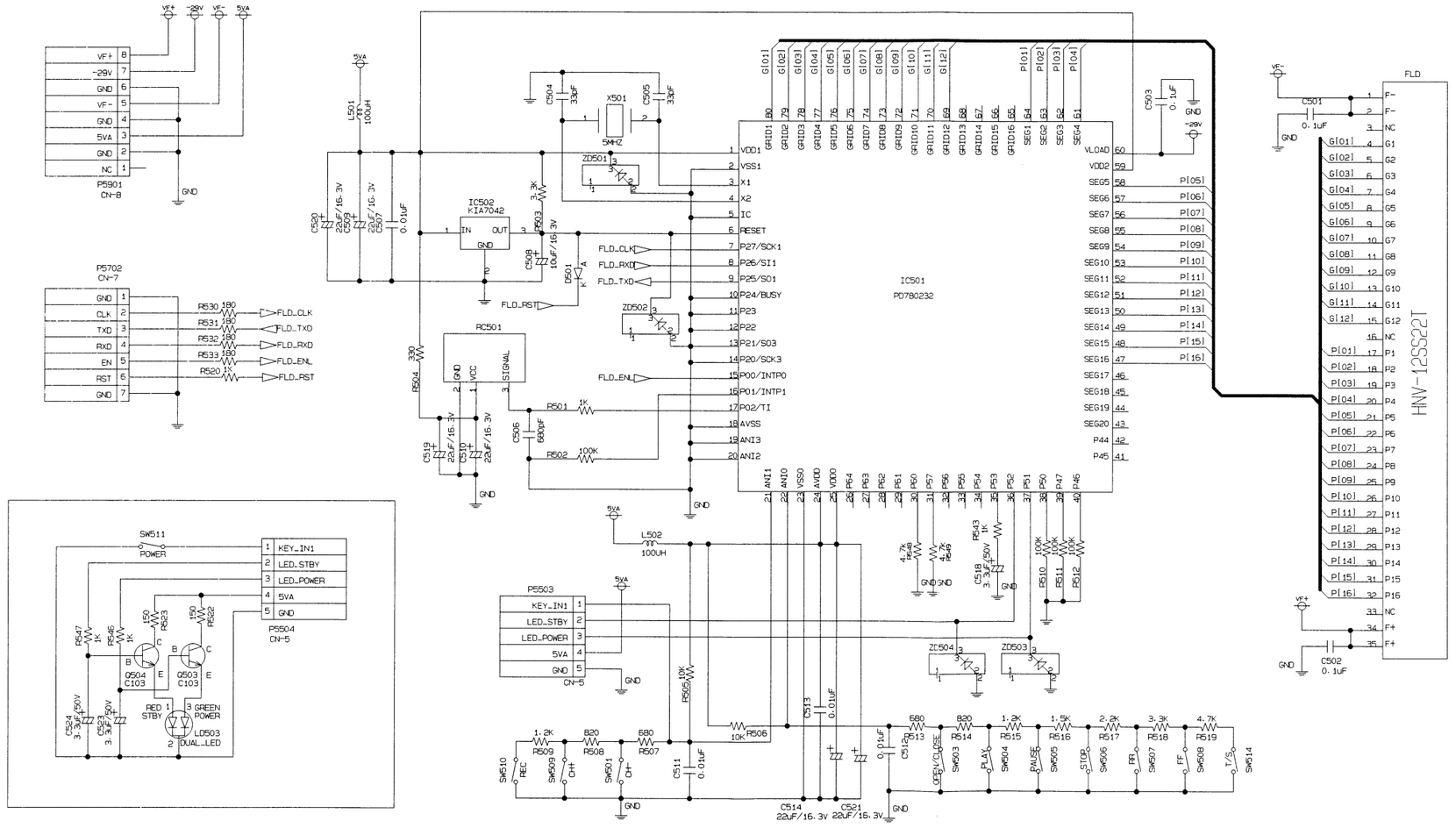
8. I/O MICOM CIRCUIT DIAGRAM



9. TUNER, VIDEO IN/OUT CIRCUIT DIAGRAM

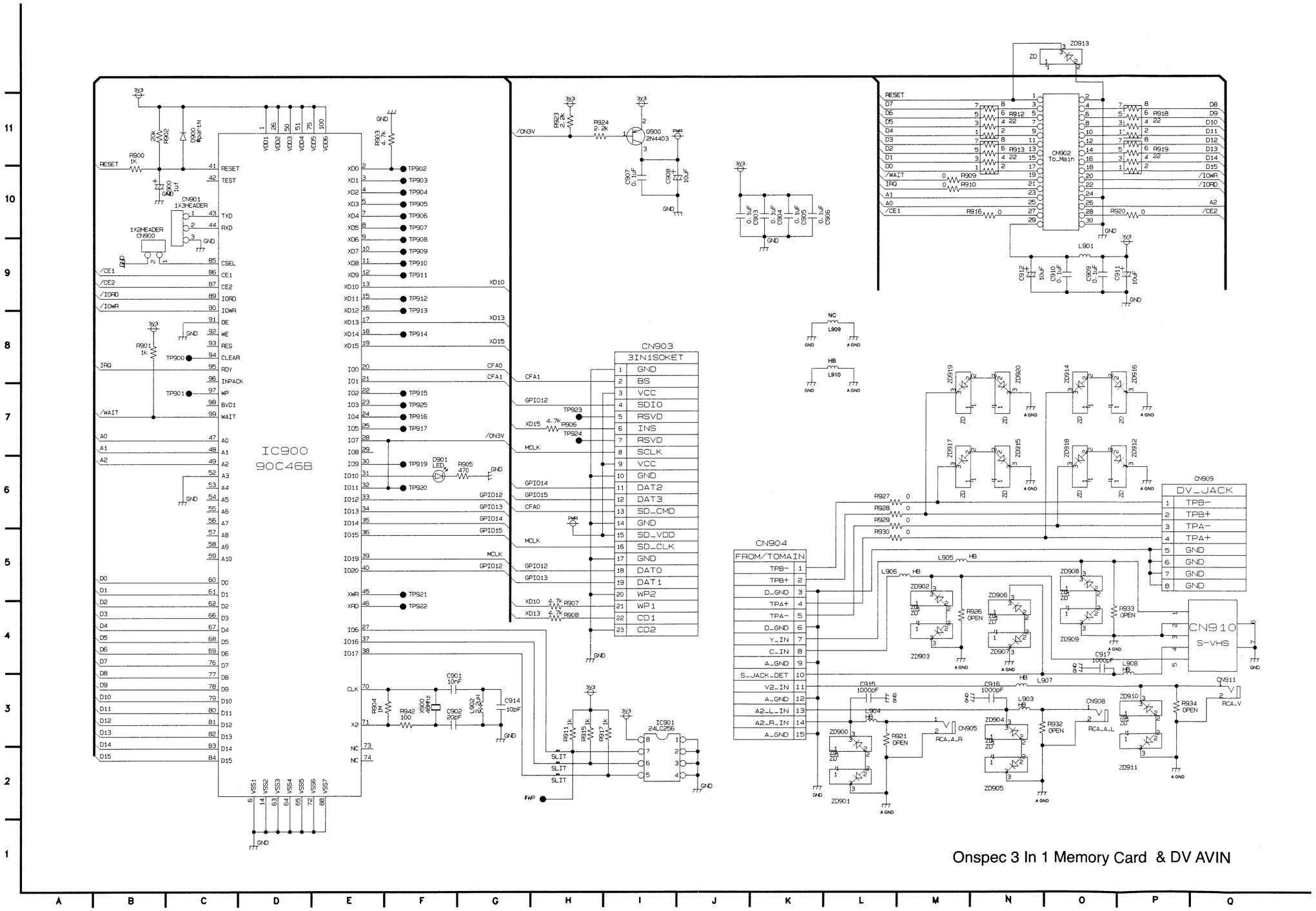


10. FRONT CIRCUIT DIAGRAM



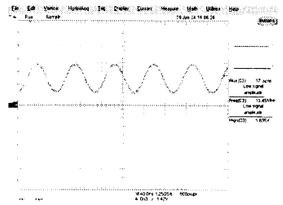
HDD+VDR_FRONT

11. Onspec 3 In 1 Memory Card & DV AVIN CIRCUIT DIAGRAM



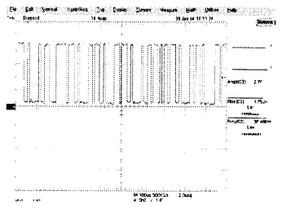
• WAVEFORMS

①



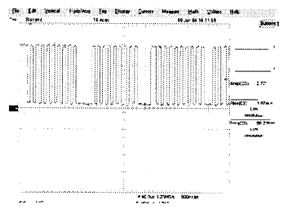
X101
13.5MHz

②



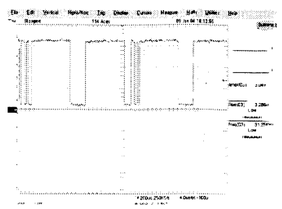
IC501
PIN32
SDA

③



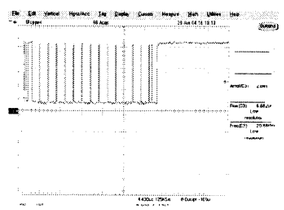
IC501
PIN31
SCL

④



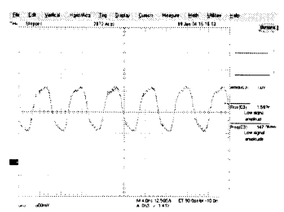
CN601
PIN24
HOST_RXD

⑤



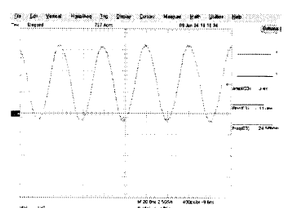
CN601
PIN26
HOST_TXD

⑥



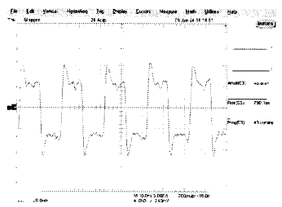
IC206
PIN45
SDRAM_SCLK0

⑦



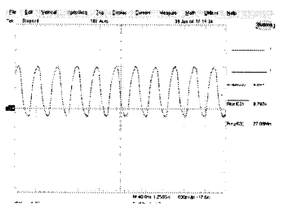
IC401
PIN77
24.576MHz

⑧



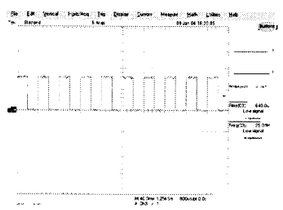
IC401
PIN2
BIO_PHY_CLK

⑨



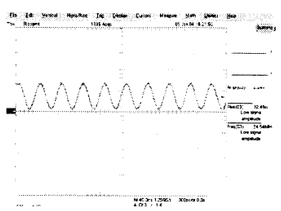
IC501
PIN94
VI_CLK0

⑩



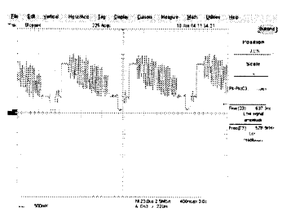
IC501
PIN91
VI_SYNC0

⑪



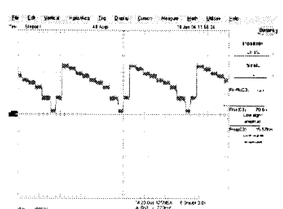
IC501
PIN6
24.576MHz

⑫



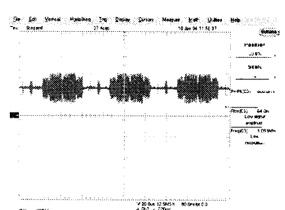
CN502
PIN6
CVBS_OUT

⑬



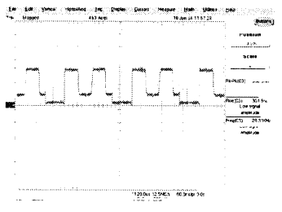
CN502
PIN4
Y_OUT

⑭



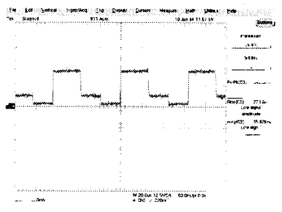
CN502
PIN2
C_OUT

⑭



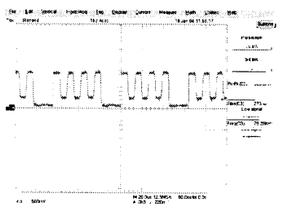
CN502
PIN7
R_Pr_OUT

⑯



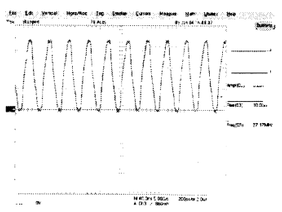
CN502
PIN8
G_Y_OUT

⑰



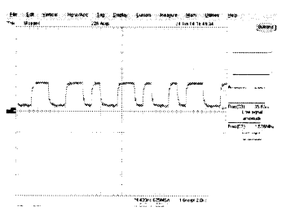
CN502
PIN9
B_Pb_OUT

⑱



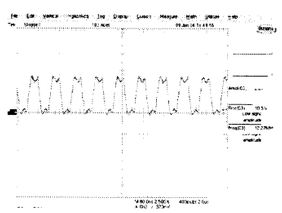
IC502
PIN32
VO_CLK

⑲



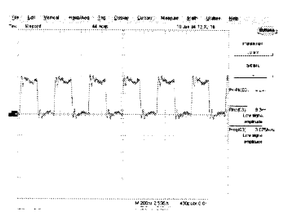
CN601
PIN2
AO_IEC958

⑳



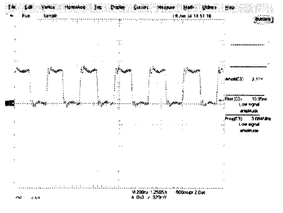
CN601
PIN7
ADC_MCLK

㉑



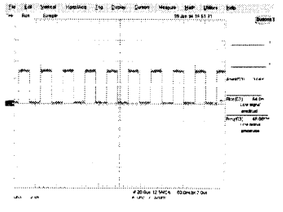
CN601
PIN5
AI_SCLK

㉒



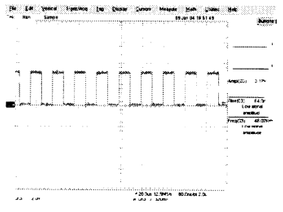
CN601
PIN19
AO_SCLK

㉓



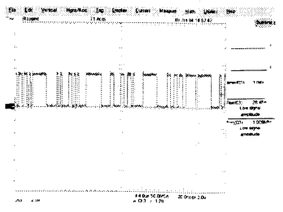
CN601
PIN4
AI_FSYNC

㉔



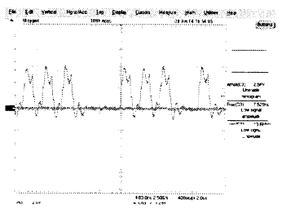
CN601
PIN17
AO_FSYNC

㉕



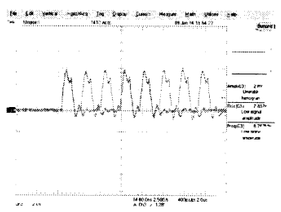
CN601
PIN21
AO_D0

㉖



IC502
PIN4
VO_D0

㉗



IC501
PIN90
VI_D0

• CIRCUIT VOLTAGE CHART

MODE / PIN NO.	EE	PB	REC
IC202			
1	0.03	0.03	0.03
2	0.03	0.03	0.03
3	0.03	0.03	0.03
4	0.03	0.03	0.03
5	0.03	0.03	0.03
6	0.03	0.03	0.03
7	0.03	0.03	0.03
8	3.29	3.29	3.29
9	0.03	0.03	0.03
10	0.03	3.29	3.29
11	3.29	3.29	3.29
12	3.29	3.29	3.29
13	0	0	0
14	3.29	3.29	3.29
15	0.23	0.25	0.25
16	0.03	0.03	0.03
17	0.03	0.03	0.03
18	0.03	0.03	0.03
19	0.03	0.03	0.03
20	0.03	0.03	0.03
21	3.29	3.29	3.29
22	3.29	3.29	3.29
23	3.29	3.29	3.29
24	3.29	3.29	3.29
25	3.29	3.29	3.29
26	3.29	3.29	3.29
27	0	0	0
28	3.29	3.29	3.29
29	2.94	2.93	2.93
30	2.94	2.93	2.93
31	0	0	0
32	0	0	0
33	0	0	0
34	0	0	0
35	2.94	3.08	3.08
36	0	0	0
37	3.29	3.29	3.29
38	2.94	2.93	2.93
39	2.94	2.93	2.93
40	2.94	2.93	2.93
41	2.94	2.94	2.94
42	0	0	0
43	0	0	0
44	0	0	0
45	0	0	0
46	0	0	0
47	3.29	3.29	3.29
48	0.03	0.03	0.03
IC208			
1	0	0	0
2	0	0	0
3	1.23	1.23	1.23
4	1.24	1.23	1.23
5	2.5	2.49	2.49

MODE / PIN NO.	EE	PB	REC
6	2.5	2.49	2.49
7	2.5	2.49	2.49
8	1.23	1.23	1.23
IC302			
1	3.25	3.25	3.25
2	3.25	3.25	3.25
3	0	0	0
4	0	0	0
5	3.25	3.25	3.25
6	0	0	0
7	3.25	3.25	3.25
8	3.25	3.25	3.25
9	3.25	3.25	3.25
10	3.25	3.25	3.25
11	0	0	0
12	3.25	3.25	3.25
13	3.25	3.25	3.25
14	3.25	3.25	3.25
15	3.25	3.25	3.25
16	0	0	0
17	0	0	0
18	3.25	3.25	3.25
19	3.25	3.25	3.25
20	3.25	3.25	3.25
21	3.25	3.25	3.25
22	0	0	0
23	3.25	3.25	3.25
24	0	0	0
25	3.25	3.25	3.25
26	0.05	0.05	0.04
27	3.25	3.25	3.25
28	3.25	3.25	3.25
29	3.25	3.25	3.25
30	0	0	0
31	3.25	3.25	3.25
32	0.3	0.3	0.3
33	3.25	3.25	3.25
34	3.25	3.25	3.25
35	0	0	0
36	0	0	0
37	0	0	0
38	0	0	0
39	0	0	0
40	3.25	3.25	3.25
41	3.25	3.25	3.25
42	3.25	3.25	3.25
43	0.04	0.04	0.04
44	0.04	0.04	0.04
IC401			
1	0	0	0
2	1.59	1.59	1.59
3	0	0	0
4	0.04	0.04	0.04
5	0	0	0
6	3.25	3.25	3.25

MODE / PIN NO.	EE	PB	REC
7	0.02	0.02	0.02
8	0.02	0.02	0.02
9	3.25	3.25	3.25
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	3.25	3.25	3.25
18	0	0	0
19	3.25	3.25	3.25
20	0	0	0
21	0	0	0
22	0	0	0
23	0	0	0
24	0	0	0
25	3.25	3.25	3.25
26	3.25	3.25	3.25
27	3.24	3.24	3.24
28	0	0	0
29	3.25	3.25	3.25
30	3.25	3.25	3.25
31	3.25	3.25	3.25
32	0	0	0
33	0	0	0
34	3.25	3.25	3.25
35	3.25	3.25	3.25
36	0	0	0
37	0	0	0
38	0	0	0
39	0	0	0
40	0	0	0
41	0	0	0
42	0	0	0
43	0	0	0
44	3.24	3.24	3.24
45	3.24	3.24	3.24
46	3.25	3.25	3.25
47	3.25	3.25	3.25
48	0	0	0
49	0	0	0
50	3.24	3.24	3.24
51	3.24	3.24	3.24
52	3.24	3.24	3.24
53	3.24	3.24	3.24
54	3.25	3.25	3.25
55	0	0	0
56	0	0	0
57	3.24	3.24	3.24
58	3.24	3.24	3.24
59	3.24	3.24	3.24
60	0	0	0
61	0	0	0

MODE / PIN NO.	EE	PB	REC
62	3.25	3.25	3.25
63	3.25	3.25	3.25
64	0	0	0
65	0	0	0
66	0	0	0
67	1.26	1.26	1.26
68	3.25	3.25	3.25
69	3.25	3.25	3.25
70	0	0	0
71	0	0	0
72	1.05	1.05	1.05
73	3.25	3.25	3.25
74	0	0	0
75	0	0	0
76	1.47	1.47	1.47
77	1.45	1.45	1.45
78	3.25	3.25	3.25
79	3.25	3.25	3.25
80	0	0	0
IC501			
1	3.24	3.24	3.24
2	0.03	0.03	0.03
3	0	0	0
4	0.37	0.37	0.37
5	0	0	0
6	1.57	1.57	1.57
7	1.5	1.5	1.5
8	3.24	3.24	3.24
9	0	0	0
10	0.83	0.83	0.83
11	3.24	3.24	3.24
12	0.05	0.05	0.05
13	1.04	1.04	1.04
14	0.06	0.05	0.05
15	0	0	0
16	0.05	0.05	0.05
17	3.24	3.24	3.24
18	1.02	1.02	1.02
19	1.04	1.04	1.04
20	0.06	0.06	0.06
21	0	0	0
22	0.06	0.06	0.06
23	3.24	3.24	3.24
24	0	0	0
25	3.24	3.24	3.24
26	0	0	0
27	3.25	3.25	3.25
28	1.65	1.65	1.65
29	0.07	0.07	0.07
30	3.24	3.24	3.24
31	3.1	3.1	3.1
32	3.1	3.1	3.1
33	3.24	3.24	3.24
34	3.24	3.24	3.24
35	3.25	3.25	3.25

MODE / PIN NO.	EE	PB	REC
36	2.9	2.9	2.9
37	1.25	1.25	1.25
38	0	0	0
39	1.62	1.62	1.62
40	1.62	1.62	1.62
41	1.26	1.26	1.26
42	2.35	2.35	2.35
43	3.24	3.24	3.24
44	0.06	0.05	0.06
45	1.7	1.7	1.7
46	2.26	2.26	2.26
47	0	0	0
48			
49			
50	0	0	0
51	3.24	3.24	3.24
52	3.05	3.05	3.05
53	2.24	2.24	2.24
54	1.08	1.08	1.08
55	0.96	0.96	0.96
56	1.12	1.12	1.12
57	0.96	0.97	0.96
58	3.24	3.24	3.24
59	0.87	0.87	0.87
60	1.12	1.12	1.12
61	1.12	1.12	1.12
62	1.14	1.14	1.14
63	0	0	0
64	0.02	0.02	0.02
65	0.02	0.02	0.02
66	0.02	0.02	0.02
67	0.03	0.03	0.03
68	3.24	3.24	3.24
69	0.03	0.03	0.03
70	0.03	0.03	0.03
71	0.03	0.03	0.03
72	0.02	0.02	0.02
73	3.24	3.24	3.24
74	0.03	0.03	0.03
75	3.24	3.24	3.24
76	0	0	0
77	2.32	2.32	2.32
78	0.04	0.04	0.04
79	2.33	2.33	2.33
80	0	0	0
81	1.56	1.56	1.56
82	1.13	1.13	1.13
83	3.24	3.24	3.24
84	1.34	1.34	1.34
85	1.42	1.42	1.42
86	1.08	1.08	1.08
87	1.28	1.28	1.28
88	0	0	0
89	1.34	1.34	1.34
90	1.34	1.34	1.34

MODE / PIN NO.	EE	PB	REC
91	1.33	1.33	1.33
92	2.69	2.69	2.69
93	3.24	3.24	3.24
94	1.68	1.68	1.68
95	2.04	2.04	2.04
96	3.23	3.23	3.23
97	0.03	0.03	0.03
98	0	0	0
99	0	0	0
100	0	0	0
IC502			
1	2.5	2.49	2.49
2	0	0	0
3	0	0	0
4	1.13	1.21	1.13
5	1.14	1.18	1.14
6	1.22	1.17	1.17
7	1.01	1.11	1.01
8	1.35	1.45	1.32
9	1.18	1.2	1.17
10	2.5	2.49	2.49
11	0	0	0
12	0.98	1.01	0.98
13	1.61	1.57	1.62
14	0	0	0
15	0	0	0
16	1.07	1.19	1.06
17	1.11	1.17	1.11
18	1.08	1.14	1.08
19	2.5	2.49	2.49
20	0	0	0
21	3.02	3.03	3.03
22	3.02	3.02	3.03
23	2.5	2.49	2.49
24	2.5	2.49	2.49
25	2.5	2.49	2.49
26	1.13	1.16	1.12
27	0.98	1.07	0.98
28	1.19	1.24	1.18
29	0.98	1.07	0.98
30	2.23	2.17	2.24
31	2.9	2.89	2.89
32	1.62	1.61	1.61
33	3.18	3.18	3.18
34	1.23	1.23	1.23
35	1.26	1.26	1.26
36	1.21	1.21	1.21
37	0.16	0.16	0.16
38	0.16	0.17	0.16
39	0.15	0.15	0.15
40	0	0	0
41	2.5	2.49	2.49
42	0.33	0.33	0.33
43	0.31	0.31	0.31
44	0.31	0.31	0.31

MODE / PIN NO.	EE	PB	REC
45	1.25	1.24	0.24
46	1.26	1.26	1.26
47	1.26	1.26	1.26
48	0	0	0
49	2.51	2.5	2.5
50	2.51	2.5	2.5
51	0	0	0
52	0	0	0
53	1.13	1.21	1.13
54	1.16	1.18	1.15
55	1.18	1.16	1.16
56	2.5	2.49	2.49
57	0	0	0
58	1.11	1.11	0.95
59	1.36	1.44	1.34
60	1.16	1.2	1.16
61	0.98	1.01	0.98
62	1.61	1.57	1.61
63	1.62	1.61	1.61
64	0	0	0
IC900			
1	3.22	3.22	3.22
2	0.27	0.27	0.27
3	2.36	2.36	2.36
4	2.35	2.35	2.35
5	2.36	2.36	2.36
6	0	0	0
7	2.36	2.36	2.36
8	2.36	2.36	2.36
9	2.37	2.37	2.37
10	2.37	2.37	2.37
11	2.36	2.36	2.36
12	2.36	2.36	2.36
13	2.36	2.36	2.36
14	0	0	0
15	2.36	2.36	2.36
16	2.36	2.36	2.36
17	2.37	2.37	2.37
18	2.37	2.37	2.37
19	2.37	2.37	2.37
20	0.01	0.01	0.01
21	0	0	0
22	0.01	0.01	0.01
23	0.01	0.01	0.01
24	3.22	3.22	3.22
25	3.22	3.22	3.22
26	3.22	3.22	3.22
27	3.22	3.22	3.22
28	3.22	3.22	3.22
29	3.22	3.22	3.22
30	0	0	0
31	3.15	3.15	3.15
32	3.22	3.22	3.22
33	2.41	2.41	2.41
34	2.39	2.39	2.39

MODE / PIN NO.	EE	PB	REC
35	2.38	2.38	2.38
36	2.38	2.38	2.38
37	3.22	3.22	3.22
38	3.22	3.22	3.22
39	2.39	2.39	2.39
40	2.41	2.41	2.41
41	4.08	4.08	4.08
42	2.38	2.38	2.38
43	3.22	3.22	3.22
44	2.38	2.38	2.38
45	3.22	3.22	3.22
46	2.96	2.96	2.96
47	0.1	0.1	0.1
48	0.1	0.1	0.1
49	0.1	0.1	0.1
50	3.22	3.22	3.22
51	3.22	3.22	3.22
52	0	0	0
53	2.37	2.37	2.37
54	2.37	2.37	2.37
55	2.36	2.36	2.36
56	2.37	2.37	2.37
57	2.37	2.37	2.37
58	2.37	2.37	2.37
59	2.37	2.37	2.37
60			
61			
62			
63	0	0	0
64	0	0	0
65	0	0	0
66			
67	2.37	2.37	2.37
68			
69	2.37	2.37	2.37
70	1.56	1.56	1.56
71	1.56	1.56	1.56
72	0	0	0
73			
74			
75	3.22	3.22	3.22
76			
77			
78			
79			
80			
81	2.37	2.37	2.37
82	2.37	2.37	2.37
83	2.38	2.38	2.38
84			
85	2.38	2.38	2.38
86	3.25	3.25	3.25
87	3.25	3.25	3.25
88	0	0	0
89	4.35	4.35	4.35

MODE / PIN NO.	EE	PB	REC
90	4.35	4.35	4.35
91	0	0	0
92	2.37	2.37	2.37
93	2.37	2.37	2.37
94	2.37	2.37	2.37
95	0	0	0
96	3.22	3.22	3.22
97			
98	3.22	3.22	3.22
99	3.57	3.57	3.57
100	3.22	3.22	3.22
IC702			
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	1.82	1.82	1.81
12	1.85	1.85	1.85
13	1.62	1.63	1.63
14	0.54	0.06	0.058
15	0	0	0
16	2.87	2.87	2.85
17	2.4	2.4	2.38
18	4.96	4.96	4.95
19	4.43	4.44	4.44
20	0	0	0
21	4.82	4.84	4.84
22	0	0	0
23	0	0	0
24	0	0	0
25	0	0	0
26	0.1	0.1	0.1
27	0.1	0.1	0.1
28	0.1	0.1	0.1
29	0.1	0.1	0.1
30	0	0	0
31	2.52	2.52	2.51
32	2.5	2.52	2.52
33	0.1	0.1	0.1
34	0.1	0.1	0.1
35	0	0	0
36	4.96	4.94	4.97
37	4.75	4.75	4.75
38	0	0	0
39	4.97	4.96	4.96
40	0.3	0.32	0.32
41	0.32	0.32	0.32
42	0.04	0.04	0.04
43	0	0	0

MODE / PIN NO.	EE	PB	REC
44	5.1	5.08	5.1
45	0	0	0
46	5.2	5.18	5.1
47	0.02	0.03	0.03
48	2.5	2.5	2.5
49	0.09	0.09	0.09
50	2.56	2.55	2.55
51	2.56	2.55	2.55
52	0.03	0.02	0.02
53	0.03	0.02	0.02
54	0.12	0.1	0.1
55	0	0	0
56	5.1	5.08	5.08
57	0	0	0
58	0	0	0
59	5.11	5.1	5.1
60	5.1	5.1	5.1
61	5.03	5	5
62	0	0	0
63	2.49	2.47	2.47
64	3.84	3.82	3.82
65	0	0	0
66	0.33	0.32	0.31
67	0	0	0
68	4.8	4.9	4.9
69	0	0	0
70	5.2	5.22	5.22
71	0	0	0
72	0	0	0
73	5.1	5.1	5.1
74	0	0	0
75	1.45	1.47	1.47
76	1.43	1.43	1.45
77	5.21	5.21	5.21
78	2.5	2.52	2.52
79	0	0	0
80	0	0	0
81	3.42	3.4	3.41
82	5.08	5.11	5.1
83	0	0	0
84	0	0	0
85	0	0	0
86	2.53	2.54	2.52
87	2.53	2.54	2.52
88	4.94	4.96	4.96
89	4.04	4.06	4.06
90	2.18	2.2	2.2
91	4.27	4.3	4.3
92	5.06	5.1	5.1
93	0	0	0
94	0.02	0.02	0.02
95	0	0	0
96	0.31	0.31	0.31
97	0	0.02	0.02
98	0	0.02	0.02

MODE / PIN NO.	EE	PB	REC
99	2.06	2.06	2.06
100	0	0	0
101	0	0	0
102	0	0	0
103	0	0	0
104	0	0	0
105	0	0	0
106	0	0	0
107	0	0	0
108	0	0	0
109	0.03	0.06	0.06
110	0	0	0
111	0	0	0
112	5.1	5.2	5.2
IC705			
1	4.96	4.96	4.96
2	1.87	1.9	1.91
3	2.08	2.1	2.13
4	1.98	2	2
5	0	0	0
6	2.68	2.71	2.71
7	4.93	4.95	4.96
8	4.93	4.95	4.96
9	0.04	0.06	0.06
IC201			
1	3.25	3.24	3.25
2	4.99	4.99	4.99
3	1.63	1.63	1.63
4	1.64	1.63	1.64
5	1.63	1.62	1.63
6	1.65	1.65	1.65
7	0	0	0
8	3.09	3.08	3.09
9	3.08	3.09	3.08
10	4.99	4.99	4.99
11	4.96	4.95	4.96
12	2.34	2.34	2.34
13	0	0	0
14	2.38	2.38	2.38
15	2.39	2.39	2.39
16	0	0	0
17	4.99	4.99	4.99
18	2.37	2.37	2.37
19	2.37	2.37	2.37
20	0	0	0
IC804			
1	2.64	2.74	2.74
2	12.24	12.26	12.26
3	2.64	2.75	2.75
4	12.24	12.26	12.25
5	2.66	3.41	3.41
6	5.78	5.83	5.77
7	5.83	5.81	5.82
8	5.75	5.74	5.74
9	4.67	0	5.75

MODE / PIN NO.	EE	PB	REC
10	5.75	5.74	5.74
11	0	11.64	11.64
12	5.81	5.82	5.82
13	0	0	0
14	0	5.74	5.74
15	0	0	0
16	5.75	5.74	5.74
17	0	0	0
18	0	0	0
19	0	0	0
20	5.81	5.81	5.81
21	0.05	0	0
22	5.88	5.84	5.84
23	5.8	5.76	5.76
24	0	0	0
25	0.05	0	0
26	5.87	5.84	5.85
27	5.79	5.76	5.76
28	3.58	3.73	3.57
29	0	0	0
30	0	0	0
31	2.3	2.32	2.32
32	5.04	5.05	5.05
33	5.08	5.08	5.08
34	0	0	0
IC806			
1	5.13	5.07	5.08
2	2.41	0	2.41
3	4.95	0	4.95
4	0	1.5	1.45
5	0	0	0
6	0	0	0
7	0	0	0
8	2.46	0	2.45
9	0	0	0
10	1.13	1.25	1.24
11	0	0	0
12	0	0	0
13	4.95	4.95	4.95
14	2.41	2.4	2.4
15	0	0	0
16	2.47	2.47	2.47
17	0	0	0
18	2.44	2.44	2.44
19	0	0	0
20	0	1.42	1.32
21	0	2.08	1.89
22	0	0	0
23	1.16	1.99	1.85
24	0	0	0
25	0	0	0
26	2.49	2.48	2.48
27	0	0	0
28	5.07	5.07	5.07

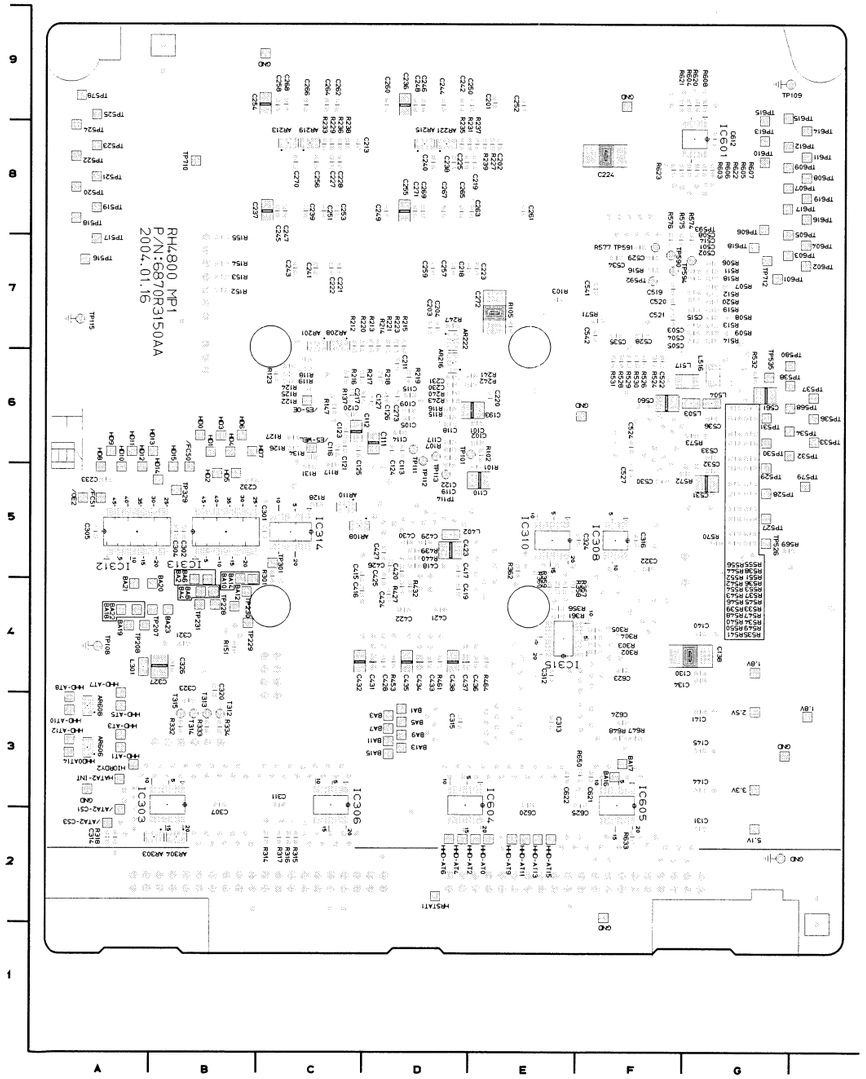
MODE / PIN NO.	EE	PB	REC
IC807			
1	5.08	5.07	5.08
2	0.52	1.52	1.52
3	1.52	1.52	1.52
4	0	0	0
5	2.39	2.42	2.4
6	2.18	2.18	2.18
7	0.4	0.23	0.24
8	0.39	0	0
9	0.39	0	0
10	0	0	0
11	0	0	0
12	5.07	5.08	5.08
13	5.04	5.06	5.05
14	0.41	0.24	0.28
15	0.38	0.23	0.25
16	0.41	0	0
17	0.36	0.23	0.29
18	0.44	0.24	0.44
19	5.08	5.08	5.08
20	0	0	0
21	0	0	0.24
22	0	0	0
23	0	0	0
24	0	0	0
25	0	0	0
26	0	0	0
27	0	0	0
28	0	0	0
29	0	0	0
30	2.55	2.55	2.55
31	2.56	2.56	2.53
32	0	0	0
33	5.08	5.08	5.08
34	4.96	4.96	4.96
35	0	0	0
36	2.55	2.55	2.54
37	0	0	0
38	0	0	0
39	0	0	0
40	2.54	2.55	2.53
41	0	0	0
42	2.61	2.544	2.6
43	0	0	0
44	0	0	0
IC808			
1	8.16	8.16	8.16
2	5.12	5.12	5.12
3	7.96	7.94	7.94
4	0	0	0
5	8.16	8.16	8.16
6	12.09	12.1	12.1
7	7.31	7.31	7.31
8	0	0	0

MODE / PIN NO.	EE	PB	REC
IC815			
1	4.99	4.99	5
2	1.66	1.65	1.66
3	4.99	4.99	5
4	1.89	1.89	1.88
5	0	0	0
6	4.99	4.99	4.99
7	1.64	1.63	1.64
8	1.62	1.62	1.62
9	3.25	3.25	3.25
10	2.48	2.48	2.48
11	2.49	2.49	2.49
12	2.48	2.48	2.48
13	4.99	4.99	4.99
14	0	0	0
15	4.97	4.97	4.97
16	4.99	4.99	4.99
IC153			
1	13.05		
2	12.15		
3	0		
4	5.02		
IC156			
1	13.05		
2	12.16		
3	0		
4	2.02		
IC159			
1	2.93		
2	4.21		
3	0		
4	1.2		
5	2.54		
IC158			
1	13.3		
2	12.1		
3	0		
4	4.38		
IC151			
1	5.53		
2	5.08		
3	0		
4	4.39		
IC154			
1	3.85		
2	3.27		
3	0		
4	5.02		
IC160			
1	2.19		
2	4.39		
3	0		
4	0		
5	1.79		

MODE / PIN NO.	EE	PB	REC
Q120			
	5.3	4.5	5.2
Q121			
	0	5.02	0.7
Q122			
	0	5.2	0
Q123			
	32.7	32	32.6
Q124			
	5.2	4.5	5.2

PRINTED CIRCUIT DIAGRAMS

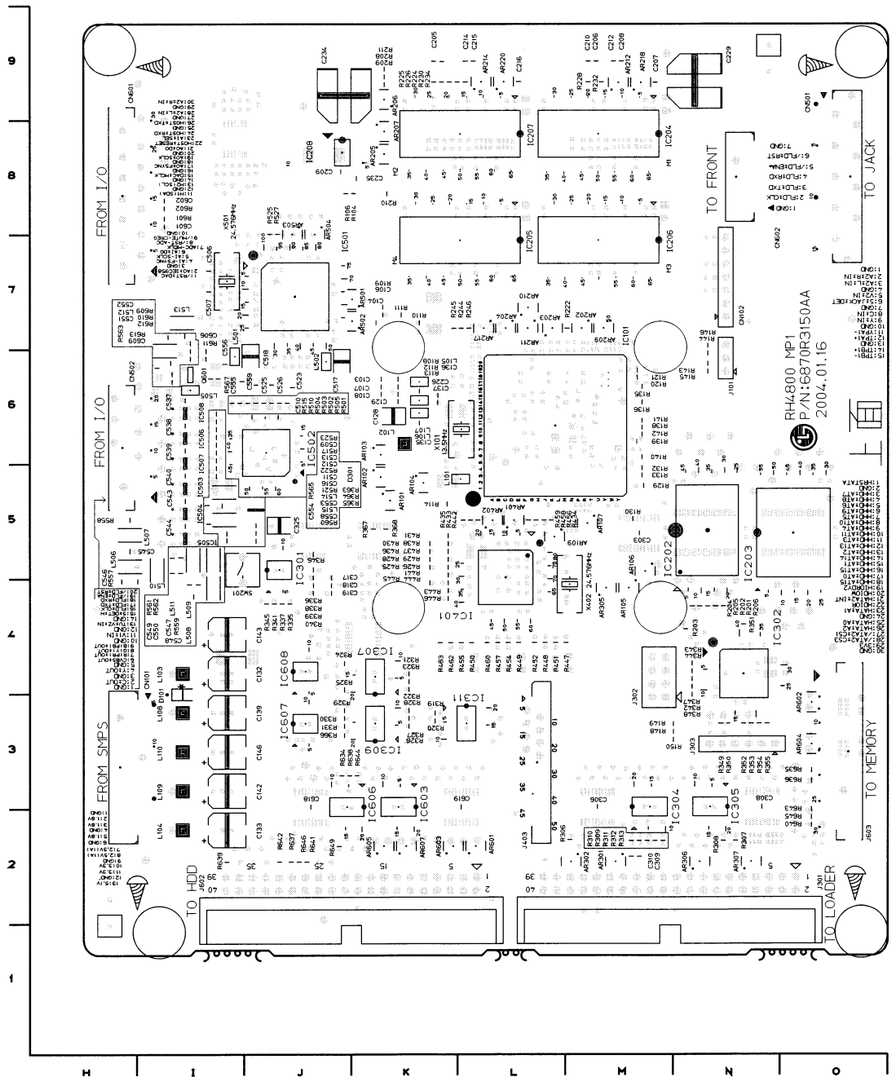
1. MAIN P.C.BOARD(TOP SIDE)



LOCATION GUIDE

AR108 C5	C232 B5	C421 D4	L402 D5	R317 C2	R571 F7	T338 F3	TP220 A5	TP353 A3	TP418 C4	TP514 F8	TP587 G5	TP666 F2
AR110 C5	C233 A5	C422 D4	LE03 G6	R318 A2	R572 G5	T339 E4	TP221 A6	TP354 A3	TP419 D5	TP515 F8	TP588 G6	TP667 G2
AR201 C7	C236 D9	C423 D5	LE04 G6	R332 B3	R573 G6	T340 E4	TP222 A5	TP355 A3	TP420 D5	TP516 A7	TP589 F6	TP668 G2
AR208 C7	C237 C8	C424 D4	LE16 G6	R333 B3	R574 G7	T341 F4	TP223 B6	TP356 A3	TP421 D5	TP517 A7	TP590 F7	TP669 F2
AR213 C8	C238 D8	C425 D4	LE17 G6	R334 B3	R575 F7	T342 F4	TP224 B5	TP357 A2	TP422 D5	TP518 A8	TP591 F7	TP670 F2
AR215 D8	C239 C8	C426 D5	R101 E5	R356 E4	R576 F7	T343 F4	TP225 B5	TP358 A2	TP423 D5	TP519 A8	TP592 F7	TP671 F2
AR216 D6	C240 D8	C427 D5	R102 E6	R357 E4	R577 F7	T344 E4	TP226 B5	TP359 A2	TP424 D5	TP520 A8	TP593 G7	TP672 F2
AR219 C8	C241 C7	C428 D4	R103 E7	R358 E4	R603 F8	T345 F3	TP227 A5	TP360 A2	TP425 D5	TP521 A8	TP594 F7	TP673 F2
AR221 D8	C242 D9	C429 D5	R105 E7	R359 E4	R604 G9	T350 E4	TP228 B4	TP361 E3	TP426 D5	TP522 A8	TP601 G7	TP674 E2
AR222 D7	C243 C7	C430 D5	R107 D6	R360 E4	R605 G8	T351 F4	TP229 B4	TP362 E3	TP427 D5	TP523 A8	TP602 H7	TP675 A3
AR303 B2	C244 D9	C431 D4	R115 D6	R361 E4	R606 G8	T355 C5	TP230 B4	TP363 E3	TP428 D5	TP524 A8	TP603 G7	TP676 E2
AR304 B2	C245 C8	C432 C4	R116 D6	R362 E5	R607 G8	T361 C6	TP231 B4	TP364 E3	TP429 D5	TP525 A9	TP604 H7	TP677 E2
AR606 A3	C246 D9	C433 D4	R117 C5	R427 D4	R608 G9	T363 C6	TP301 C5	TP365 E3	TP430 D5	TP526 G5	TP605 G8	TP678 E2
AR608 A3	C247 C8	C434 C4	R118 C6	R432 D4	R620 G9	T364 C6	TP302 B4	TP366 E3	TP431 D5	TP527 G5	TP606 G8	TP679 A3
C101 E6	C248 D9	C435 D4	R119 C6	R439 D5	R621 F9	T365 F4	TP303 C4	TP367 E3	TP432 D4	TP528 G5	TP607 G6	TP680 A3
C102 E6	C249 D8	C436 E4	R122 C6	R440 D5	R622 G8	T366 B4	TP304 B4	TP368 D3	TP433 D4	TP529 G5	TP608 H6	TP681 E2
C105 D6	C250 E9	C437 D4	R123 C6	R453 D4	R623 F8	TP101 E6	TP305 C3	TP369 E3	TP434 C4	TP530 G6	TP609 G6	TP682 A3
C109 D6	C251 C8	C438 D4	R124 C6	R461 D4	R633 F1	TP102 E7	TP306 C2	TP370 C2	TP435 D4	TP531 G6	TP610 G8	TP683 E3
C110 E5	C252 E9	C501 G7	R105 C6	R464 E4	R647 F3	TP103 G6	TP307 C3	TP371 C2	TP436 D4	TP532 G6	TP611 H6	TP684 A3
C111 D6	C253 C8	C502 G7	R126 C6	R506 G7	R648 F3	TP105 F9	TP308 C3	TP372 C2	TP437 D4	TP533 H6	TP612 G8	TP685 E2
C112 C6	C254 C9	C503 G7	R127 C6	R507 G7	R650 F3	TP106 G9	TP309 C2	TP373 C2	TP438 D4	TP534 G6	TP613 G8	TP686 E2
C113 D6	C255 D8	C504 G7	R128 C5	R508 G7	T135 H5	TP107 F8	TP310 C3	TP374 D2	TP439 D4	TP535 G6	TP614 H6	TP687 A3
C114 D6	C256 C8	C505 G7	R131 C5	R509 G7	T136 F6	TP111 D6	TP311 C3	TP375 B2	TP440 D4	TP536 H6	TP615 G9	TP688 D2
C115 D6	C257 D7	C508 G7	R134 C6	R511 G7	T137 F5	TP112 D6	TP312 B3	TP376 C2	TP441 D4	TP537 H6	TP616 H8	TP689 A3
C116 C6	C258 C9	C514 G7	R137 C6	R512 G7	T138 C4	TP113 D6	TP313 B3	TP377 C2	TP442 D4	TP538 G6	TP617 G8	TP690 D2
C117 D6	C259 D7	C515 G7	R147 C6	R513 G7	T139 A3	TP114 D5	TP314 B3	TP378 C2	TP443 D4	TP539 F6	TP618 G7	TP691 A2
C118 D6	C260 D9	C519 F7	R151 B4	R514 G7	T140 F2	TP116 D6	TP315 B3	TP379 C3	TP444 D4	TP540 F6	TP619 H8	TP692 E3
C119 D5	C261 E8	C520 F7	R152 B7	R516 F7	T301 E3	TP117 D6	TP316 B3	TP380 C3	TP445 E4	TP541 F6	TP620 G7	TP693 F2
C120 C6	C262 C9	C521 F7	R153 B7	R518 G7	T302 E3	TP118 C6	TP317 B3	TP381 C3	TP446 D3	TP542 F6	TP621 G9	TP694 F2
C121 C6	C263 E8	C522 F6	R154 B7	R519 G7	T303 D3	TP119 C6	TP318 B3	TP382 C3	TP447 D3	TP543 F6	TP625 F8	TP695 F2
C122 D6	C264 C9	C524 F6	R155 B7	R520 G7	T304 D3	TP120 C6	TP319 B3	TP383 C3	TP448 D3	TP544 F6	TP626 F8	TP696 F5
C123 C6	C265 D8	C527 F6	R212 C7	R524 F6	T305 D3	TP121 C7	TP320 A2	TP384 C3	TP449 D3	TP545 F6	TP627 G8	TP697 E4
C124 D6	C266 C9	C528 F7	R213 D7	R526 F6	T306 D3	TP122 G2	TP321 B3	TP385 C3	TP450 D3	TP547 F6	TP628 G8	TP698 E4
C125 C6	C267 D8	C529 F7	R214 D7	R528 F6	T307 E4	TP123 G3	TP322 B3	TP386 E3	TP451 D3	TP548 G6	TP629 G8	TP699 F2
C126 D6	C268 C9	C530 F5	R215 D7	R529 F6	T308 F4	TP124 G3	TP323 A3	TP387 E3	TP452 D3	TP550 F6	TP630 G6	TP700 F2
C127 D6	C269 D8	C531 G5	R216 C6	R530 F6	T309 F4	TP125 G4	TP324 B3	TP388 E3	TP453 D3	TP551 G6	TP635 G6	TP701 E2
C130 G4	C270 C8	C532 G5	R217 C6	R531 F6	T310 E3	TP126 E6	TP325 B3	TP389 E3	TP454 E5	TP552 F6	TP638 G9	TP702 D2
C131 G2	C271 D8	C533 G6	R218 D6	R532 G6	T311 E3	TP127 B7	TP326 B3	TP390 E3	TP455 B4	TP553 F6	TP639 F9	TP703 F2
C134 G4	C272 E7	C534 F7	R219 D6	R533 G5	T312 B3	TP128 G3	TP327 B3	TP391 F3	TP456 B4	TP554 F6	TP640 F8	TP704 F2
C138 G4	C273 D6	C535 F7	R220 C7	R534 G5	T313 B3	TP129 G4	TP328 B3	TP392 E3	TP457 B4	TP555 F6	TP641 G8	TP705 E2
C140 G4	C301 C5	C536 G6	R221 D7	R535 G5	T314 B3	TP130 G3	TP329 B5	TP393 E3	TP458 B4	TP556 F6	TP642 F3	TP706 E2
C141 G3	C302 B5	C541 F7	R223 D7	R536 G6	T315 B3	TP131 C5	TP330 F4	TP394 F4	TP459 B4	TP557 F6	TP643 E3	TP707 E2
C144 G3	C304 B5	C542 F7	R227 E8	R537 G5	T316 F5	TP132 G3	TP331 F4	TP395 E4	TP460 B4	TP558 F6	TP644 F3	TP708 F2
C145 G3	C305 A5	C560 F6	R229 C8	R538 G6	T317 F4	TP133 G3	TP332 F4	TP396 E4	TP461 B4	TP559 F5	TP645 F3	TP709 F2
C193 E6	C307 B3	C561 G6	R231 D8	R539 G5	T318 F4	TP134 C6	TP333 F4	TP397 E4	TP465 F3	TP560 F5	TP646 F3	TP710 B8
C201 E9	C311 C3	C612 G8	R233 C8	R540 G5	T319 F4	TP201 A4	TP334 C2	TP398 E4	TP467 D2	TP561 G5	TP647 F3	TP711 G8
C202 E8	C312 E4	C620 E3	R235 D8	R541 G5	T320 F5	TP202 A4	TP335 C2	TP399 A2	TP468 D5	TP562 F6	TP648 D3	TP712 G2
C203 D7	C313 E3	C621 F3	R236 C8	R542 G6	T321 F4	TP203 B4	TP336 C2	TP401 E5	TP469 D5	TP563 F6	TP649 E3	TP713 F2
C204 D7	C314 A2	C622 E3	R237 E8	R543 G5	T322 F4	TP204 A4	TP337 C2	TP402 E5	TP470 D5	TP564 G5	TP650 D3	TP714 A2
C211 D6	C315 D3	C623 F4	R238 C8	R544 G6	T323 F4	TP205 A4	TP338 C2	TP403 D5	TP480 D5	TP565 G5	TP651 D3	TP716 A3
C213 C8	C316 F5	C624 F3	R239 E8	R545 G5	T324 F5	TP206 B4	TP339 C2	TP404 D5	TP481 D5	TP566 G5	TP652 E3	TP717 A2
C217 C6	C320 B4	C625 F3	R240 D6	R546 G5	T325 B4	TP207 B4	TP340 C2	TP405 E5	TP501 G7	TP567 G5	TP653 E3	TP718 A2
C218 D7	C321 B4	IC303 B3	R241 E6	R547 G5	T326 F5	TP208 A4	TP341 C2	TP406 E4	TP502 G7	TP568 G6	TP654 E3	TP719 A2
C219 E8	C322 F5	IC306 C3	R242 E6	R548 G5	T327 F5	TP209 A5	TP342 C2	TP407 E4	TP503 G7	TP571 G5	TP655 E3	
C220 E6	C323 B3	IC308 F5	R243 D6	R549 G5	T328 B4	TP210 B6	TP343 B2	TP408 E5	TP504 G7	TP572 G5	TP656 D3	
C221 C7	C324 F5	IC310 E5	R247 D7	R550 G5	T329 E5	TP211 B6	TP344 B2	TP409 E5	TP505 F8	TP573 G6	TP657 F3	
C222 C7	C326 B4	IC312 A5	R301 C5	R551 G6	T330 E5	TP212 B5	TP345 B2	TP410 D4	TP506 F8	TP575 G5	TP658 E3	
C223 E7	C327 B4	IC313 B5	R302 F4	R552 G6	T331 E5	TP213 B6	TP346 B2	TP411 D4	TP507 F7	TP577 G6	TP659 E3	
C224 F8	C415 C5	IC314 C5	R303 F4	R553 G6	T332 E5	TP214 B6	TP347 B2	TP412 D5	TP508 F8	TP578 A9	TP660 E3	
C225 D8	C416 C4	IC315 E4	R304 F4	R554 G6	T333 E5	TP215 B5	TP348 B2	TP413 D5	TP509 F8	TP579 H5	TP661 E3	
C227 C8	C417 D5	IC601 G8	R305 F4	R555 G6	T334 E5	TP216 B6	TP349 B2	TP414 E4	TP510 F8	TP580 G6	TP662 E3	
C228 C8	C418 D5	IC604 D2	R314 C2	R556 G6	T335 E5	TP217 B6	TP350 B2	TP415 D5	TP511 F8	TP584 G6	TP663 F4	
C230 D6	C419 D4	IC605 F3	R315 C2	R569 G5	T336 E5	TP218 A5	TP351 B2	TP416 E4	TP512 F2	TP585 F7	TP664 F4	
C231 D6	C420 D5	L301 A4	R316 C2	R570 G5	T337 E4	TP219 A6	TP352 B2	TP417 G5	TP513 F2	TP586 F6	TP665 F4	

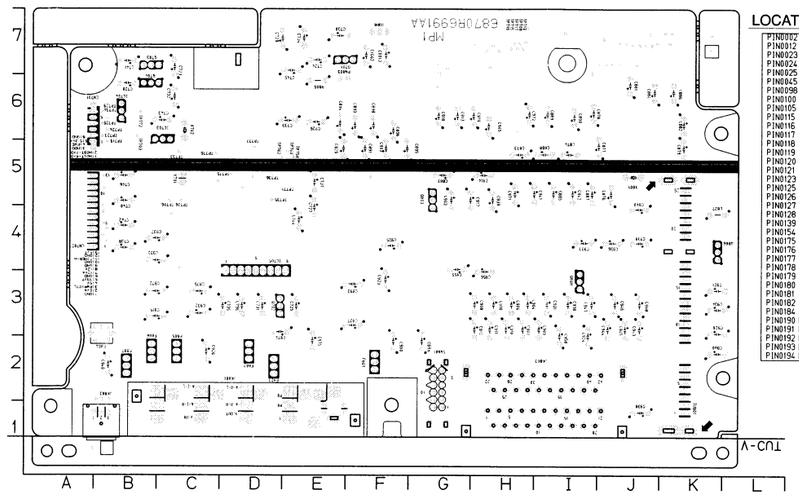
2. MAIN P.C.BOARD(BOTTOM SIDE)



LOCATION GUIDE

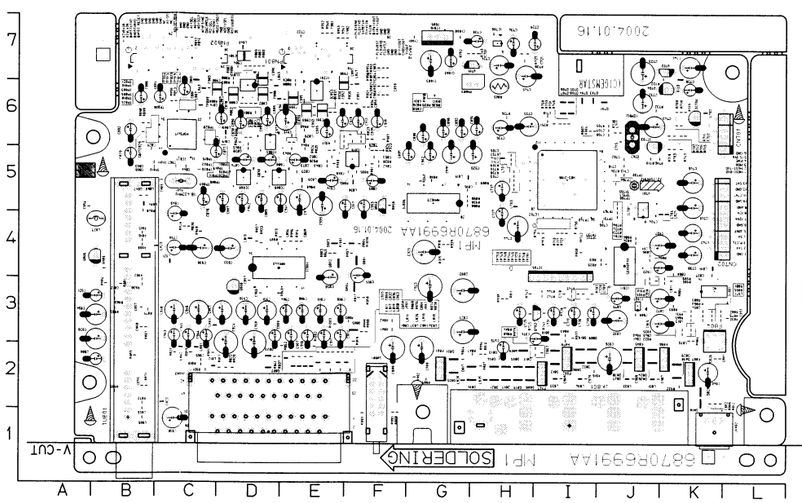
AR101	K5	C214	L9	CN602	N8	R104	K8	R323	K4	R456	L5
AR102	K5	C215	L9	D101	I3	R106	J8	R324	J4	R457	L4
AR103	K6	C216	L9	D301	J5	R108	K6	R325	J4	R458	L5
AR104	K5	C226	K6	IC101	L6	R109	K7	R326	K3	R459	L5
AR105	M4	C229	N9	IC202	N5	R110	K7	R327	K3	R460	L4
AR106	M5	C234	J9	IC203	O5	R111	K7	R328	K3	R462	K4
AR107	M5	C235	K8	IC204	M8	R112	K6	R329	J3	R463	K4
AR109	L5	C274	K9	IC205	L7	R113	K6	R330	J3	R501	J6
AR202	M7	C303	M5	IC206	M7	R114	K5	R331	J3	R502	J6
AR203	L7	C306	M3	IC207	L8	R120	M6	R335	J4	R503	J6
AR204	L7	C308	N3	IC208	J8	R121	M6	R336	J5	R504	J6
AR205	K8	C309	M2	IC301	J5	R129	M5	R337	J4	R505	J6
AR206	K9	C310	M2	IC302	N4	R130	M5	R338	J5	R510	J6
AR207	K8	C317	J5	IC304	M3	R132	M5	R339	J4	R515	I6
AR209	M7	C318	J4	IC305	N3	R133	M5	R340	J4	R517	I6
AR210	L7	C319	J4	IC307	K4	R135	M6	R341	J4	R521	I5
AR211	L7	C325	J5	IC309	K3	R136	M6	R342	N4	R522	I6
AR212	M9	C506	I7	IC311	L3	R138	M6	R343	N4	R523	I6
AR214	L9	C507	I7	IC401	L5	R139	M6	R344	N4	R525	J8
AR217	L7	C509	I6	IC501	J7	R140	M6	R345	J4	R527	J8
AR218	M9	C510	I6	IC502	J6	R141	M6	R346	J5	R557	I4
AR220	L9	C511	I6	IC503	I5	R142	M6	R347	N4	R558	H5
AR301	M2	C512	I6	IC504	I5	R143	N6	R348	N3	R559	I4
AR302	M2	C513	I6	IC505	I5	R144	N6	R349	N3	R560	I5
AR305	M4	C516	I5	IC506	I6	R145	N6	R350	N3	R561	I5
AR306	N2	C517	J6	IC507	I6	R146	N7	R351	N4	R562	I5
AR307	N2	C518	J6	IC508	I6	R148	N3	R352	N3	R563	I6
AR401	L5	C523	J6	IC603	K3	R149	N3	R353	N3	R565	I5
AR402	L5	C525	J6	IC606	J3	R150	N3	R354	N3	R567	I6
AR501	K7	C526	J6	IC607	J3	R201	N4	R355	N3	R601	I8
AR502	K7	C537	I6	IC608	J4	R202	N4	R363	J5	R602	I8
AR503	J8	C538	I6	J101	N6	R203	N4	R364	J5	R609	I7
AR504	J8	C539	I6	J301	O2	R204	N4	R365	J5	R610	I6
AR601	L2	C540	I5	J302	M3	R205	N4	R366	J3	R611	I6
AR602	O3	C543	I5	J303	N3	R206	N4	R367	K5	R612	I6
AR603	K2	C544	I5	J403	L3	R208	K9	R368	K5	R613	I6
AR604	O3	C545	H5	J602	L2	R209	K9	R425	K5	R634	J3
AR605	K2	C546	H4	J603	O3	R210	K8	R426	K5	R635	O3
AR607	K2	C547	I4	L101	L5	R211	K9	R428	K5	R636	O3
C103	K6	C548	I4	L102	K6	R222	M7	R429	K5	R637	J2
C104	K7	C549	I5	L103	I4	R224	K9	R430	K5	R638	J3
C106	K7	C550	I5	L104	I2	R225	K9	R431	K5	R639	I2
C107	K6	C551	I6	L105	K6	R226	K9	R433	L5	R640	O2
C108	K6	C552	I7	L106	K6	R228	M9	R434	L5	R641	J2
C128	K6	C553	I5	L107	K6	R230	K9	R435	L5	R642	J2
C129	K6	C554	I5	L108	I3	R232	M9	R436	K5	R643	O2
C132	I4	C555	I6	L109	I3	R234	L9	R437	K5	R644	K3
C133	I2	C556	I6	L110	I3	R244	L7	R438	K5	R645	O2
C135	K6	C557	I7	L501	I6	R245	K7	R441	K5	R646	J2
C136	K6	C558	I5	L502	J6	R246	L7	R442	L5	R649	J2
C137	K6	C559	I6	L505	I6	R306	M2	R443	K4	SW201	I5
C139	I3	C601	I8	L506	H5	R307	N2	R444	K4	TP108	O4
C142	I3	C602	I8	L507	H5	R308	N2	R445	K4	TP109	I9
C143	I4	C606	I6	L508	I4	R309	M2	R446	K4	TP110	I2
C146	I3	C609	I6	L509	I5	R310	M2	R447	M4	TP115	O7
C205	K9	C618	J3	L510	I5	R311	M2	R448	L4	X101	L6
C206	M9	C619	L3	L511	I5	R312	M2	R449	L4	X402	M4
C207	M9	CN101	H3	L512	I6	R313	M2	R450	L4	X501	I7
C208	M9	CN102	N7	L513	I7	R319	K3	R451	L4		
C209	J8	CN501	O8	L514	I5	R320	K3	R452	L4		
C210	M9	CN502	H6	L515	I5	R321	K4	R454	L4		
C212	M9	CN601	H8	Q601	I6	R322	K4	R455	L4		

3. I/O P.C.BOARD



LOCATION GUIDE

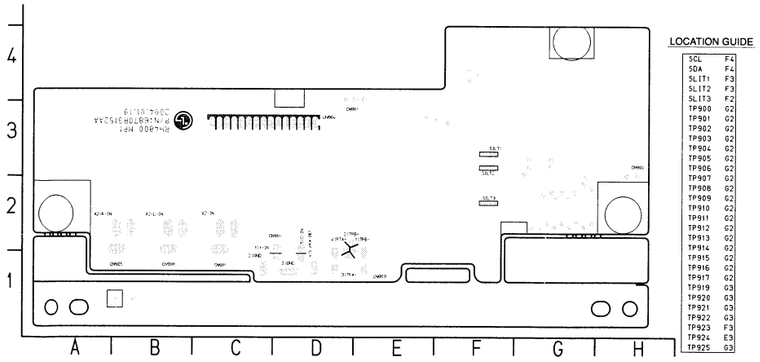
P1N0002	C4	P1N0195	B4
P1N0012	H6	P1N0196	B4
P1N0023	I7	P1N0197	B4
P1N0024	G7	P1N0198	B4
P1N0025	I7	P1N0199	B5
P1N0045	J7	P1N0200	B5
P1N0098	D5	P1N0201	G6
P1N0100	C5	P1N0202	H7
P1N0105	D5	P1N0204	J7
P1N0115	J7	P1N0207	K7
P1N0116	J7	P1N0209	G7
P1N0117	J7	TP703	B6
P1N0118	J7	TP706	C5
P1N0119	J7	TP708	H7
P1N0120	H7	TP710	H7
P1N0121	H7	TP715	H7
P1N0123	H7	TP716	H7
P1N0125	G7	TP717	H7
P1N0126	K7	TP719	B5
P1N0127	H7	TP723	B6
P1N0128	H7	TP724	B6
P1N0139	F5	TP725	B6
P1N0154	C4	TP726	C5
P1N0175	K7	TP729	B6
P1N0176	K7	TP733	C5
P1N0177	J7	TP734	B6
P1N0178	J7	TP735	D5
P1N0179	J7	TP736	D5
P1N0180	J7	TP758	E5
P1N0181	J7	TP761	E5
P1N0182	J7	TP762	D5
P1N0184	J7	TP771	D5
P1N0190	B2	TP772	B6
P1N0191	B2	TP775	D5
P1N0192	B2	TP776	C5
P1N0193	B4	TP777	D5
P1N0194	B4		



LOCATION GUIDE

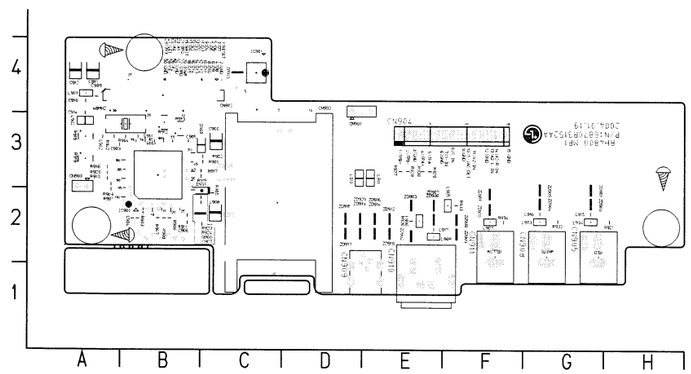
C900	C3	R934	F2
C901	B3	R942	A3
C902	A3	X900	B3
C903	A3	ZD900	G2
C904	B2	ZD901	G2
C905	B3	ZD902	E2
C906	B2	ZD903	E2
C907	C2	ZD904	G2
C908	C2	ZD905	G2
C909	A4	ZD906	E2
C910	A4	ZD907	E2
C911	A4	ZD908	F2
C912	A4	ZD909	F2
C914	A3	ZD910	F2
C915	G2	ZD911	F2
C916	G2	ZD912	E2
C917	E2	ZD913	C4
CN900	A3	ZD914	E2
CN901	D4	ZD915	D2
CN902	B4	ZD916	E2
CN903	C2	ZD917	D2
CN904	E3	ZD918	E2
CN905	G2	ZD919	D2
CN908	G2	ZD920	D2

4. JACK P.C.BOARD



LOCATION GUIDE

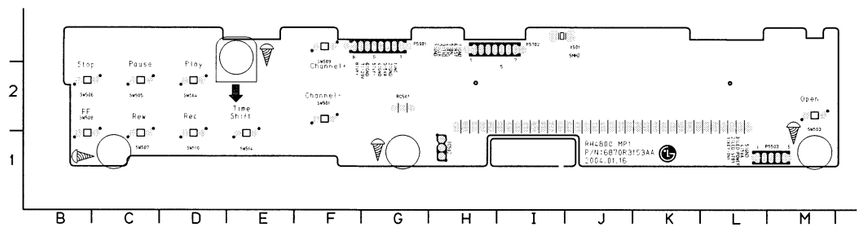
SCL	F4		
SDA	F4		
SLIT1	F3		
SLIT2	F3		
SLIT3	F2		
TP900	G2		
TP901	G2		
TP902	G2		
TP903	G2		
TP904	G2		
TP905	G2		
TP906	G2		
TP907	G2		
TP908	G2		
TP909	G2		
TP910	G2		
TP911	G2		
TP912	G2		
TP913	G2		
TP914	G2		
TP915	G2		
TP916	G2		
TP917	G2		
TP919	G3		
TP920	G3		
TP921	G3		
TP922	G3		
TP923	F3		
TP924	E3		
TP925	G3		



LOCATION GUIDE

C900	C3	R934	F2
C901	B3	R942	A3
C902	A3	X900	B3
C903	A3	ZD900	G2
C904	B2	ZD901	G2
C905	B3	ZD902	E2
C906	B2	ZD903	E2
C907	C2	ZD904	G2
C908	C2	ZD905	G2
C909	A4	ZD906	E2
C910	A4	ZD907	E2
C911	A4	ZD908	F2
C912	A4	ZD909	F2
C914	A3	ZD910	F2
C915	G2	ZD911	F2
C916	G2	ZD912	E2
C917	E2	ZD913	C4
CN900	A3	ZD914	E2
CN901	D4	ZD915	D2
CN902	B4	ZD916	E2
CN903	C2	ZD917	D2
CN904	E3	ZD918	E2
CN905	G2	ZD919	D2
CN908	G2	ZD920	D2

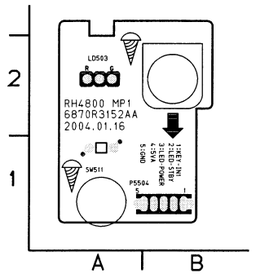
5. FRONT P.C.BOARD



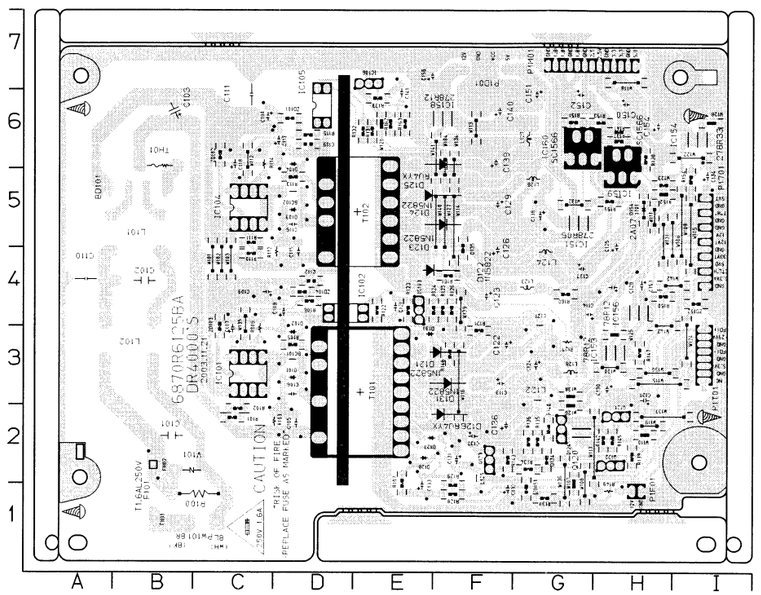
LOCATION GUIDE

C501	L1	D501	I3	C501	L1	D501	I3
C502	H1	R548	K2	C502	H1	R548	K2
C503	J2	R549	K2	C503	J2	R549	K2
C504	J3	RC501	G2	C504	J3	RC501	G2
C505	I3	SW501	F2	C505	I3	SW501	F2
C506	G2	SW503	M2	C506	G2	SW503	M2
C507	G1	SW504	D2	C507	G1	SW504	D2
C508	H1	SW505	C2	C508	H1	SW505	C2
C509	F1	SW506	B2	C509	F1	SW506	B2
C510	G2	SW507	C1	C510	G2	SW507	C1
C511	K3	SW508	B1	C511	K3	SW508	B1
C512	K2	SW509	F3	C512	K2	SW509	F3
C513	K3	SW510	D1	C513	K3	SW510	D1
C514	K3	SW511	A2	C514	K3	SW511	A2
C518	M2	SW514	E1	C518	M2	SW514	E1
C519	G2	X501	I3	C519	G2	X501	I3
C520	F1	ZD501	J2	C520	F1	ZD501	J2
C521	M3	ZD502	J2	C521	M3	ZD502	J2
C523	B2	ZD503	K2	C523	B2	ZD503	K2
C524	B2	ZD504	K2	C524	B2	ZD504	K2

6. KEY P.C.BOARD



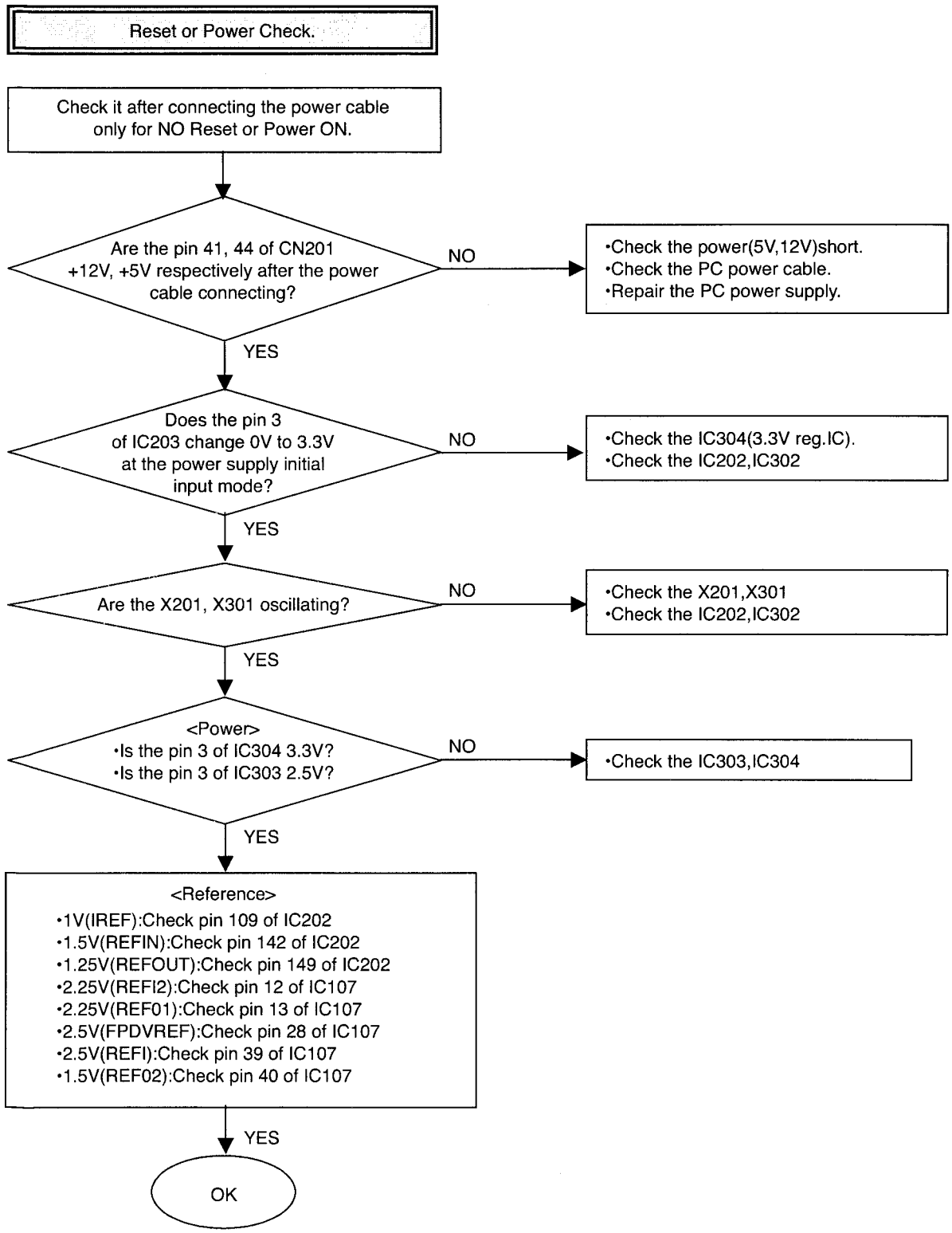
7. POWER P.C.BOARD

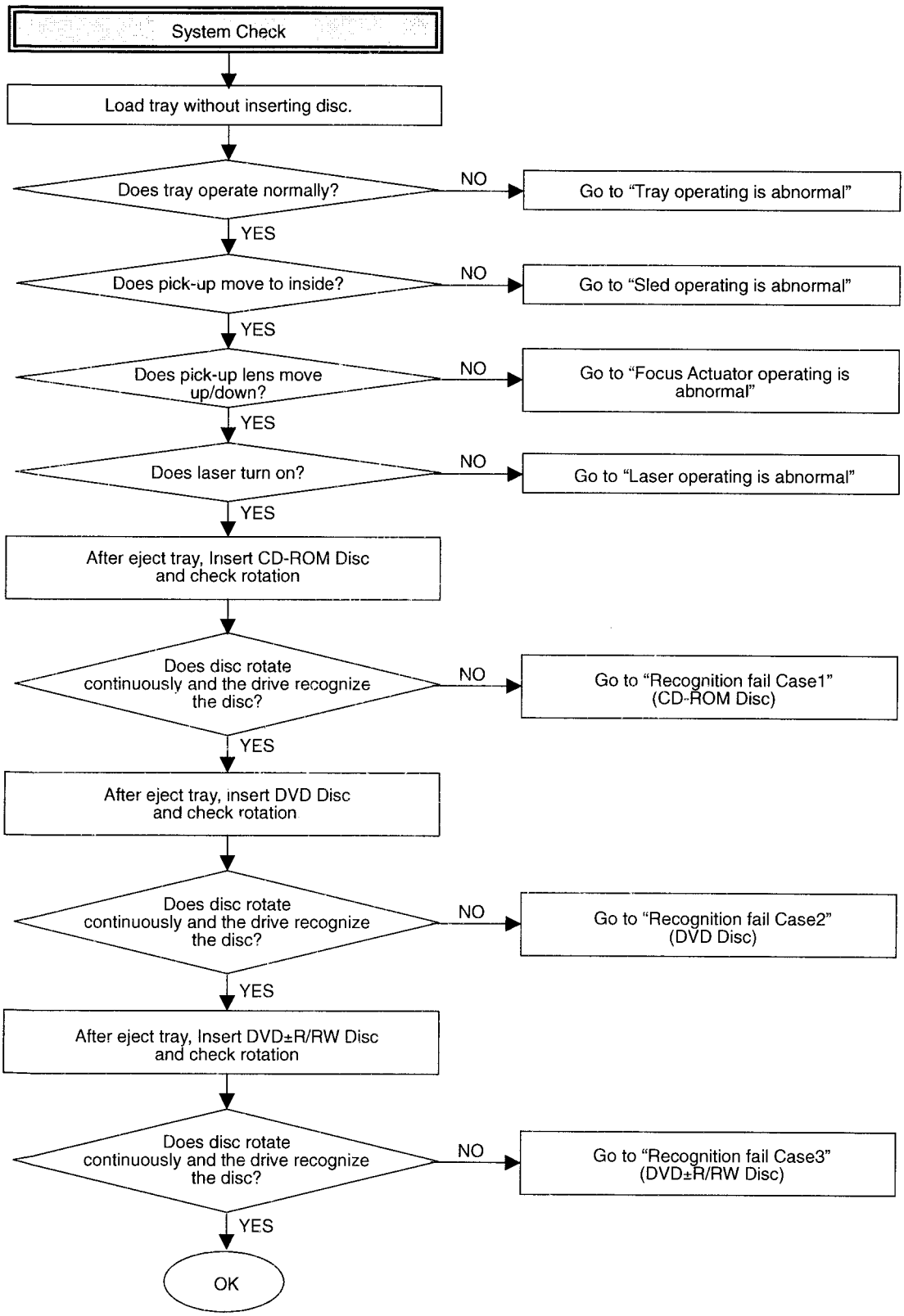


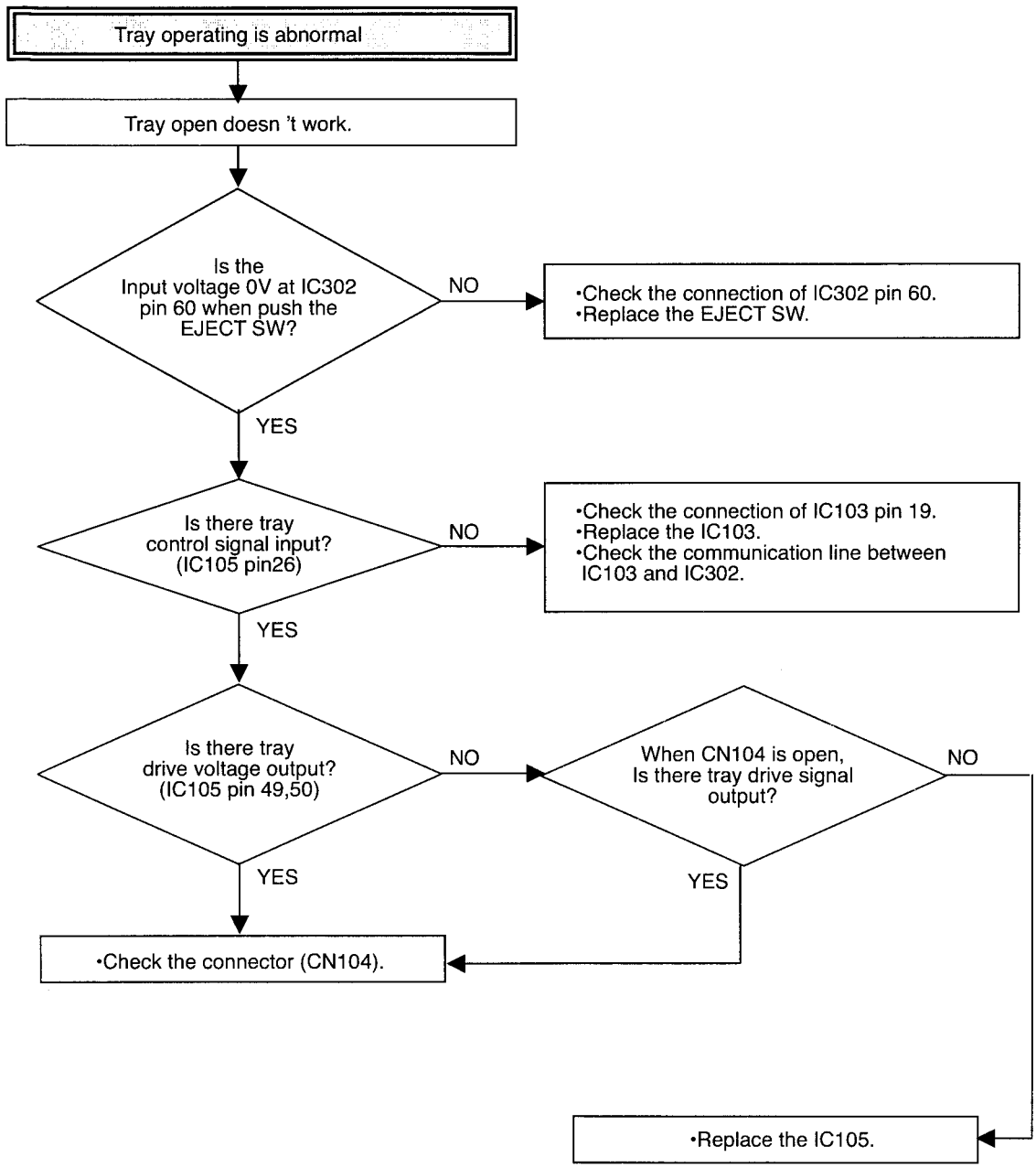
LOCATION GUIDE

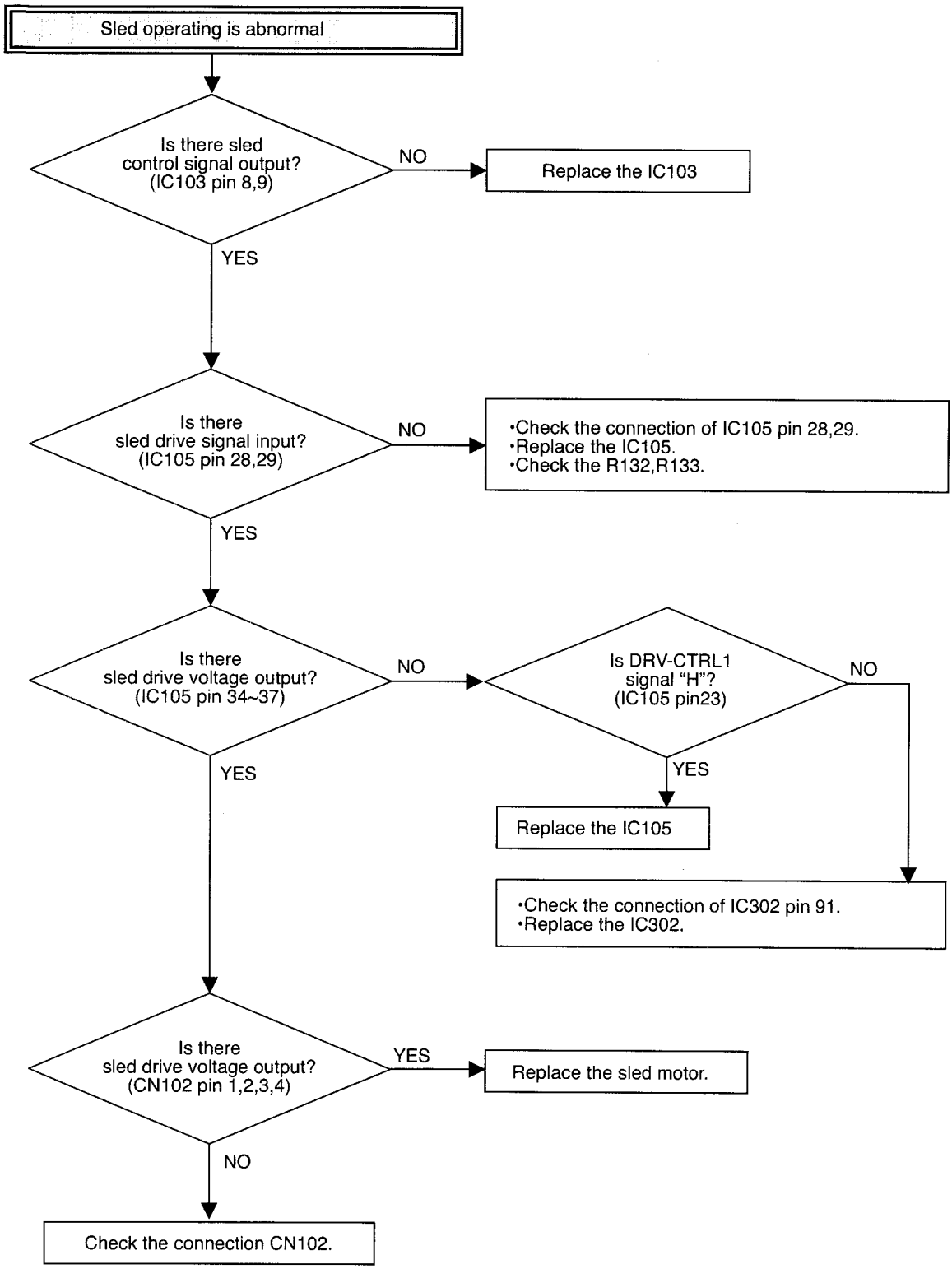
BC101	D3	C140	F6	L101	B5	R127	G3				
BC102	D5	C141	E6	L102	B3	R128	F1				
BD101	B5	C150	H6	L121	G4	R129	F1				
C101	B2	C151	G6	L122	G3	R130	G1				
C102	B4	C152	G6	L123	G4	R131	E6				
C103	B6	C153	H4	L124	G4	R132	E6				
C104	G6	C154	H6	L125	F2	R133	E6				
C105	D2	C156	E7	L126	G5	R134	G2				
C106	D3	D101	D3	L127	G6	R135	G2				
C107	C3	D102	D3	L128	G3	R136	G2				
C108	D4	D103	D5	P1701	I5	R137	H6				
C109	C4	D104	D6	P1D01	F7	R138	H6				
C110	A4	D121	F3	P1F01	H1	R139	H2				
C111	C6	D122	F4	P1H01	G7	R140	G2				
C112	D4	D123	F5	P1T01	I3	R141	H6				
C113	F3	D124	F5	PW101	C1	R142	H2				
C114	G4	D125	F6	Q120	G2	R143	F2				
C115	D4	D126	F2	Q121	H2	R145	H2				
C116	D5	D127	E2	Q122	H2	R146	F3				
C117	D6	D128	E2	Q123	F2	R147	H3				
C118	C6	D130	E3	Q124	G2	R149	H1				
C119	D6	D131	F3	R100	C1	R150	H4				
C120	H3	D134	G2	R101	C2	R151	G6				
C121	E4	D135	F4	R102	C2	R152	H5				
C122	F3	D154	H5	R103	D2	R153	H6				
C123	F4	FH01	B1	R105	D3	R154	I5				
C124	G3	FH02	B2	R106	D4	R159	H5				
C125	H5	IC101	C3	R107	E1	R160	G4				
C126	F4	IC102	E4	R109	C3	R161	F4				
C127	G4	IC103	E4	R110	C4	R162	E6				
C128	H4	IC104	C5	R111	C5	R163	E6				
C129	F5	IC105	D7	R112	D4	T101	E3				
C130	H3	IC106	E7	R113	D5	T102	E5				
C131	F2	IC151	G5	R114	C6	TH01	B6				
C132	F1	IC153	H3	R115	D6	V101	B2				
C133	E1	IC154	I6	R121	F3	ZD101	D6				
C134	I5	IC156	H4	R122	E4	ZD102	C6				
C136	F2	IC158	F6	R123	E4	ZD103	C3				
C137	F2	IC159	H6	R124	F4	ZD104	D4				
C138	G5	IC160	G6	R125	F4	ZD151	G1				
C139	F6	J101	H5	R126	F4	ZD152	I4				

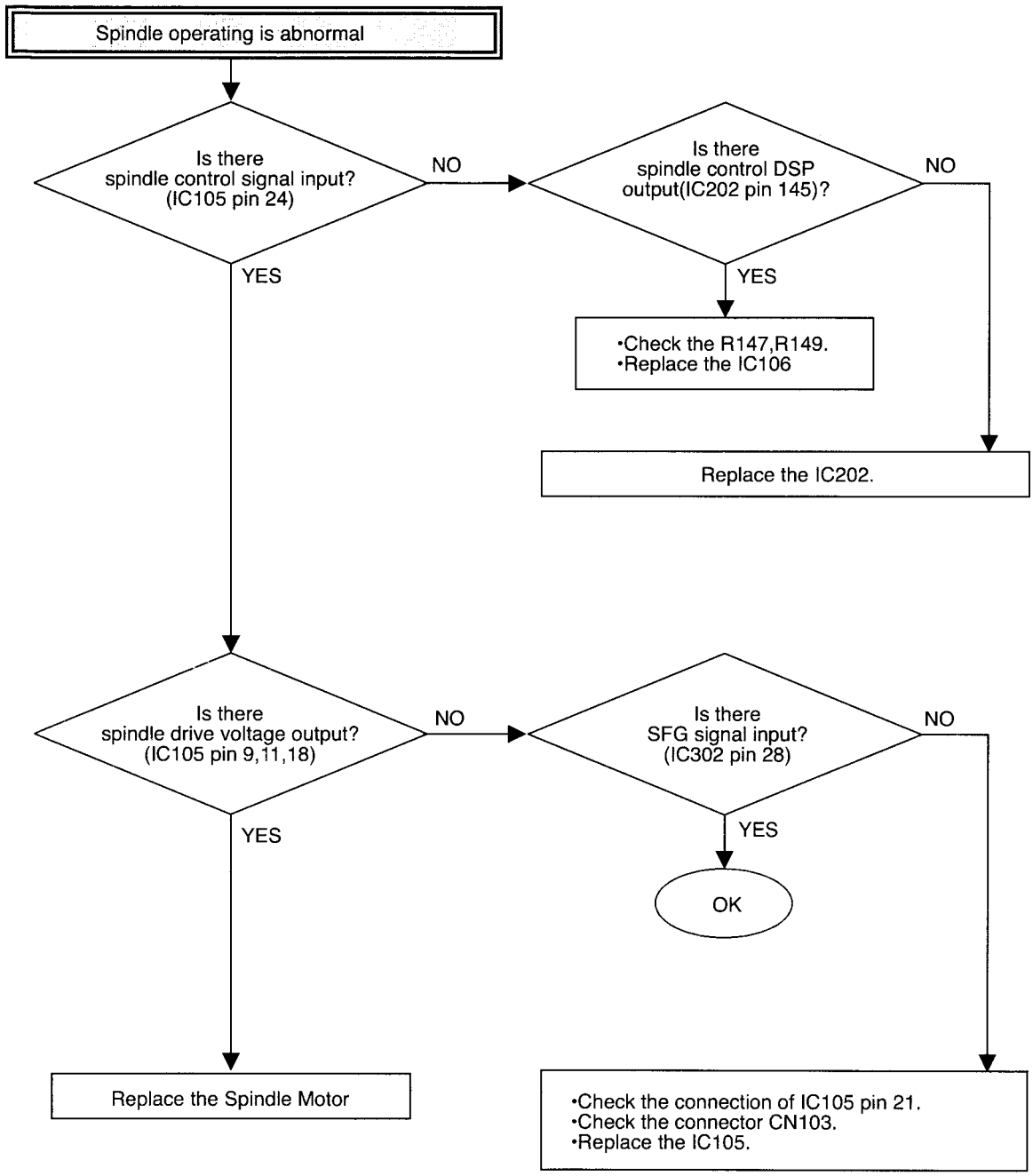
RL-01A LOADER PART
ELECTRICAL TROUBLESHOOTING GUIDE

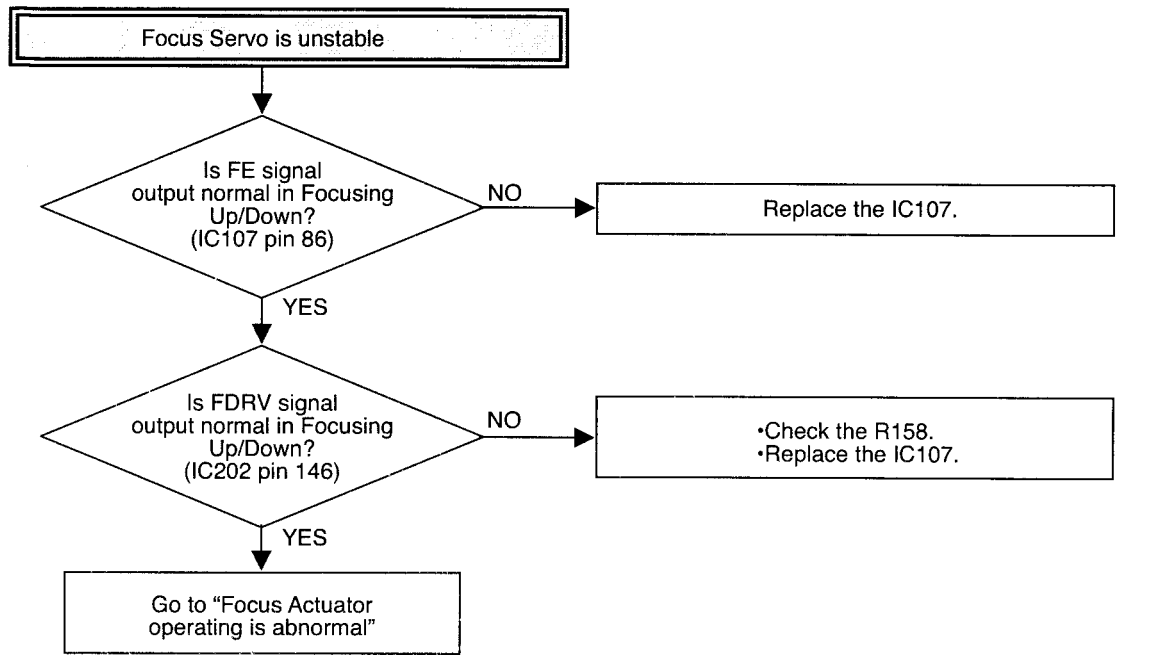

Reset or Power Check.
Check it after connecting the power cable only for NO Reset or Power ON.
Are the pin 41, 44 of CN201 +12V, +5V respectively after the power cable connecting?
NO
•Check the power(5V,12V)short.
•Check the PC power cable.
•Repair the PC power supply.
YES
Does the pin 3 of IC203 change 0V to 3.3V at the power supply initial input mode?
NO
•Check the IC304(3.3V reg.IC).
•Check the IC202,IC302
YES
Are the X201, X301 oscillating?
NO
•Check the X201,X301
•Check the IC202,IC302
YES
<Power>
•Is the pin 3 of IC304 3.3V?
•Is the pin 3 of IC303 2.5V?
NO
•Check the IC303,IC304
YES
<Reference>
•1V(IREF):Check pin 109 of IC202
•1.5V(REFIN):Check pin 142 of IC202
•1.25V(REFOUT):Check pin 149 of IC202
•2.25V(REFI2):Check pin 12 of IC107
•2.25V(REF01):Check pin 13 of IC107
•2.5V(FPDVREF):Check pin 28 of IC107
•2.5V(REFI):Check pin 39 of IC107
•1.5V(REF02):Check pin 40 of IC107
YES
OK

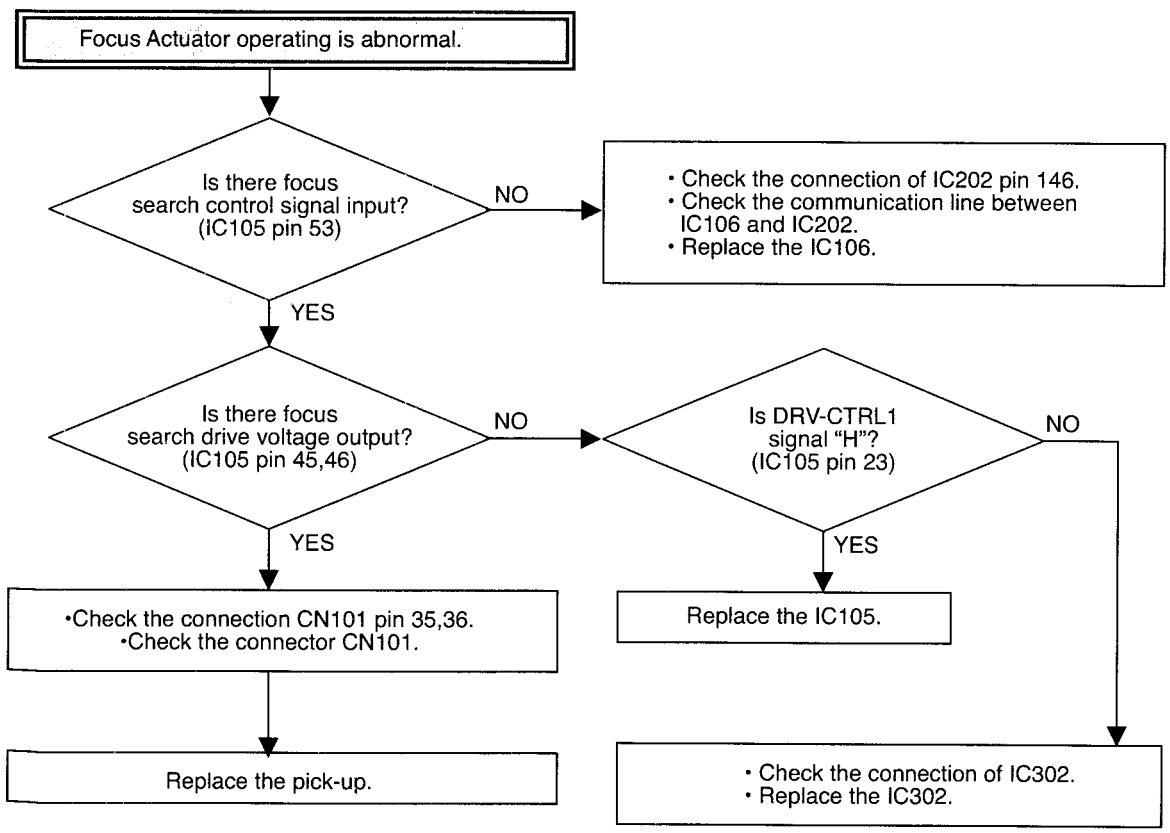

System Check
Load tray without inserting disc.
Does tray operate normally?
NO
Go to "Tray operating is abnormal"
YES
Does pick-up move to inside?
NO
Go to "Sled operating is abnormal"
YES
Does pick-up lens move up/down?
NO
Go to "Focus Actuator operating is abnormal"
YES
Does laser turn on?
NO
Go to "Laser operating is abnormal"
YES
After eject tray, Insert CD-ROM Disc and check rotation
Does disc rotate continuously and the drive recognize the disc?
NO
Go to "Recognition fail Case1" (CD-ROM Disc)
YES
After eject tray, insert DVD Disc and check rotation
Does disc rotate continuously and the drive recognize the disc?
NO
Go to "Recognition fail Case2" (DVD Disc)
YES
After eject tray, Insert DVD±R/RW Disc and check rotation
Does disc rotate continuously and the drive recognize the disc?
NO
Go to "Recognition fail Case3" (DVD±R/RW Disc)
YES
OK

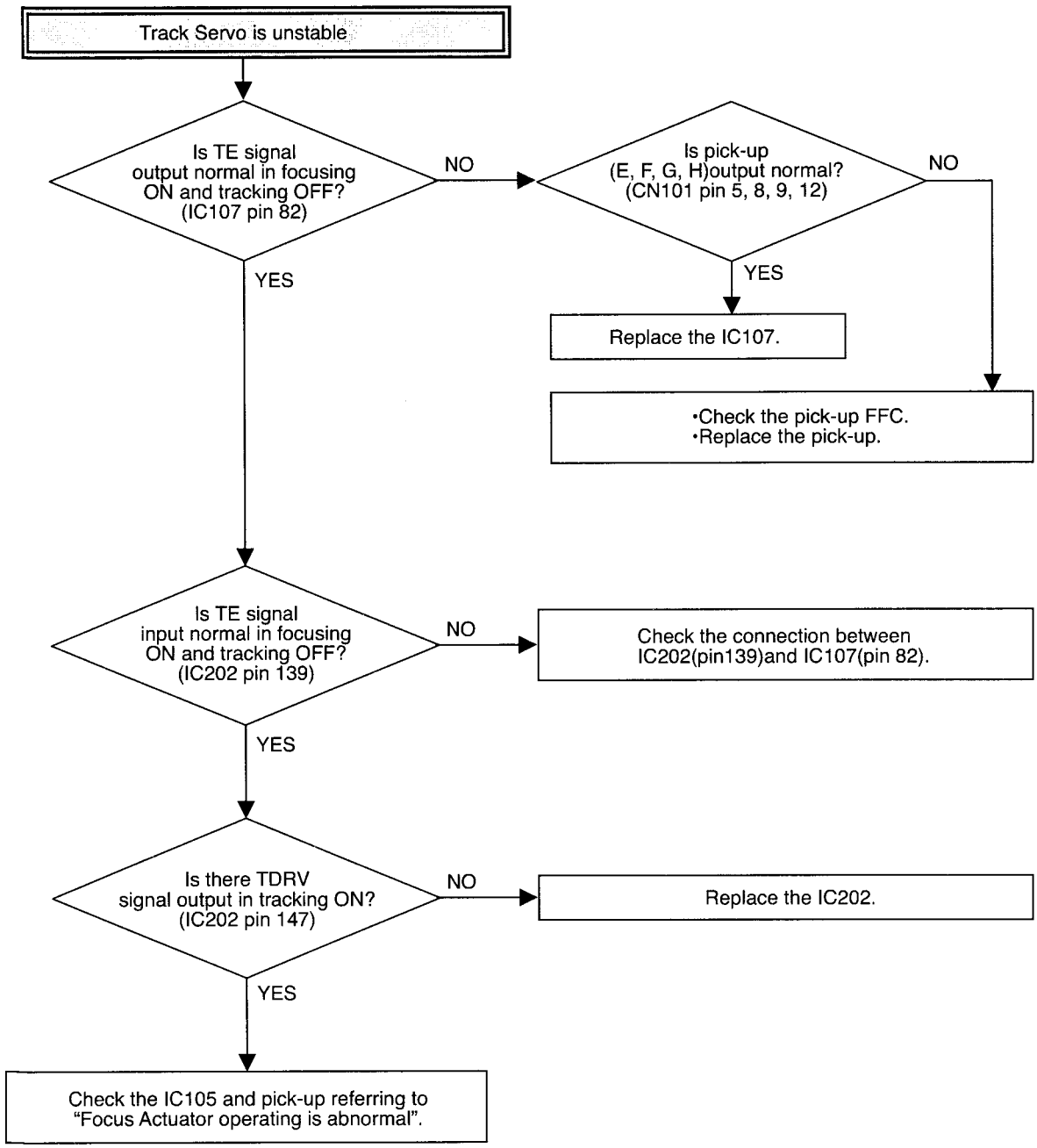

Tray operating is abnormal
Tray open doesn 't work.
Is the Input voltage 0V at IC302 pin 60 when push the EJECT SW?
NO
•Check the connection of IC302 pin 60.
•Replace the EJECT SW.
YES
Is there tray control signal input? (IC105 pin26)
NO
•Check the connection of IC103 pin 19.
•Replace the IC103.
•Check the communication line between IC103 and IC302.
YES
Is there tray drive voltage output? (IC105 pin 49,50)
NO
When CN104 is open, Is there tray drive signal output?
NO
YES
YES
•Check the connector (CN104).
•Replace the IC105.

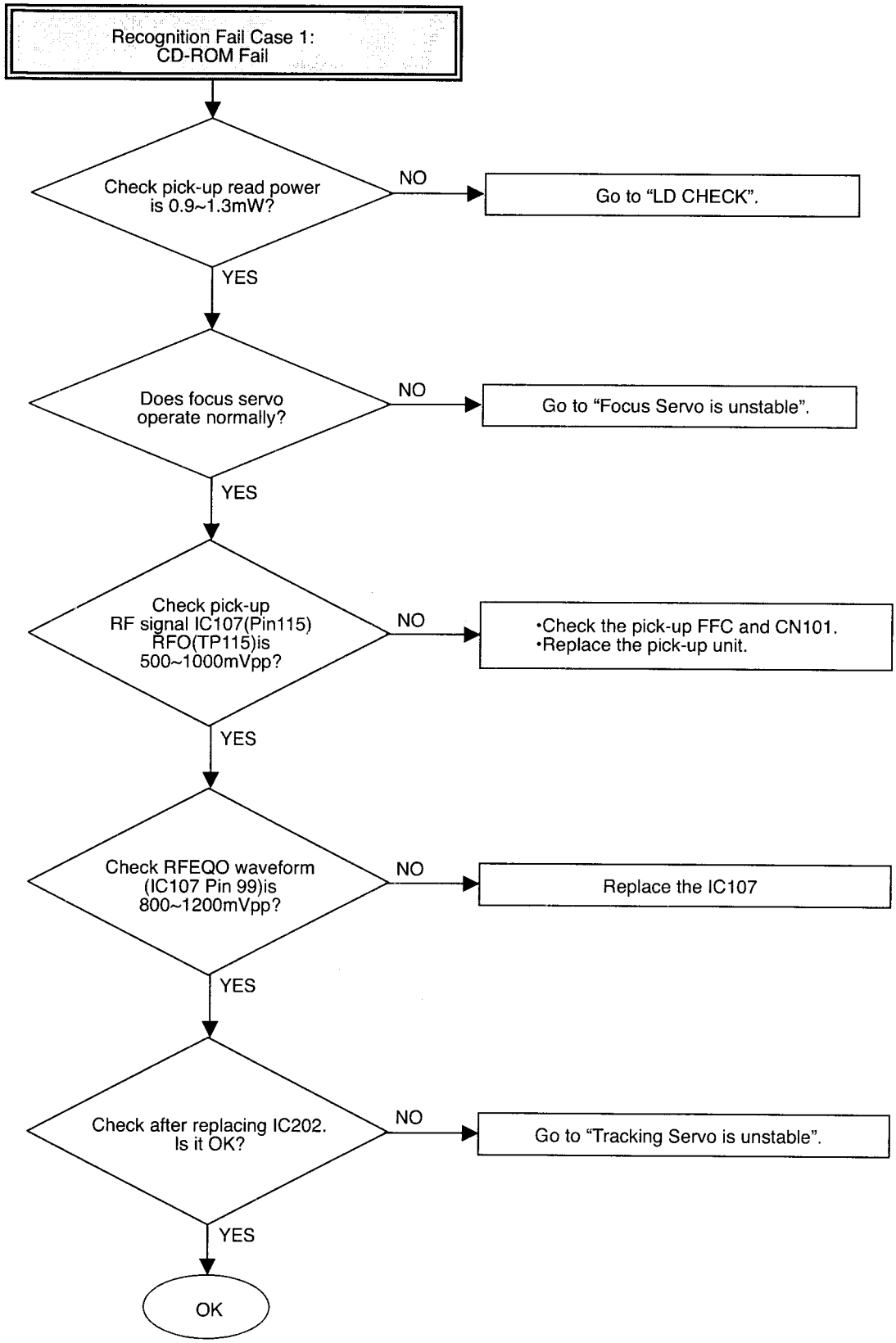

Sled operating is abnormal
Is there sled control signal output? (IC103 pin 8,9)
NO
Replace the IC103
YES
Is there sled drive signal input? (IC105 pin 28,29)
NO
•Check the connection of IC105 pin 28,29.
•Replace the IC105.
•Check the R132,R133.
YES
Is there sled drive voltage output? (IC105 pin 34~37)
NO
Is DRV-CTRL1 signal "H"? (IC105 pin23)
NO
YES
Replace the IC105
•Check the connection of IC302 pin 91.
•Replace the IC302.
YES
Is there sled drive voltage output? (CN102 pin 1,2,3,4)
YES
Replace the sled motor.
NO
Check the connection CN102.

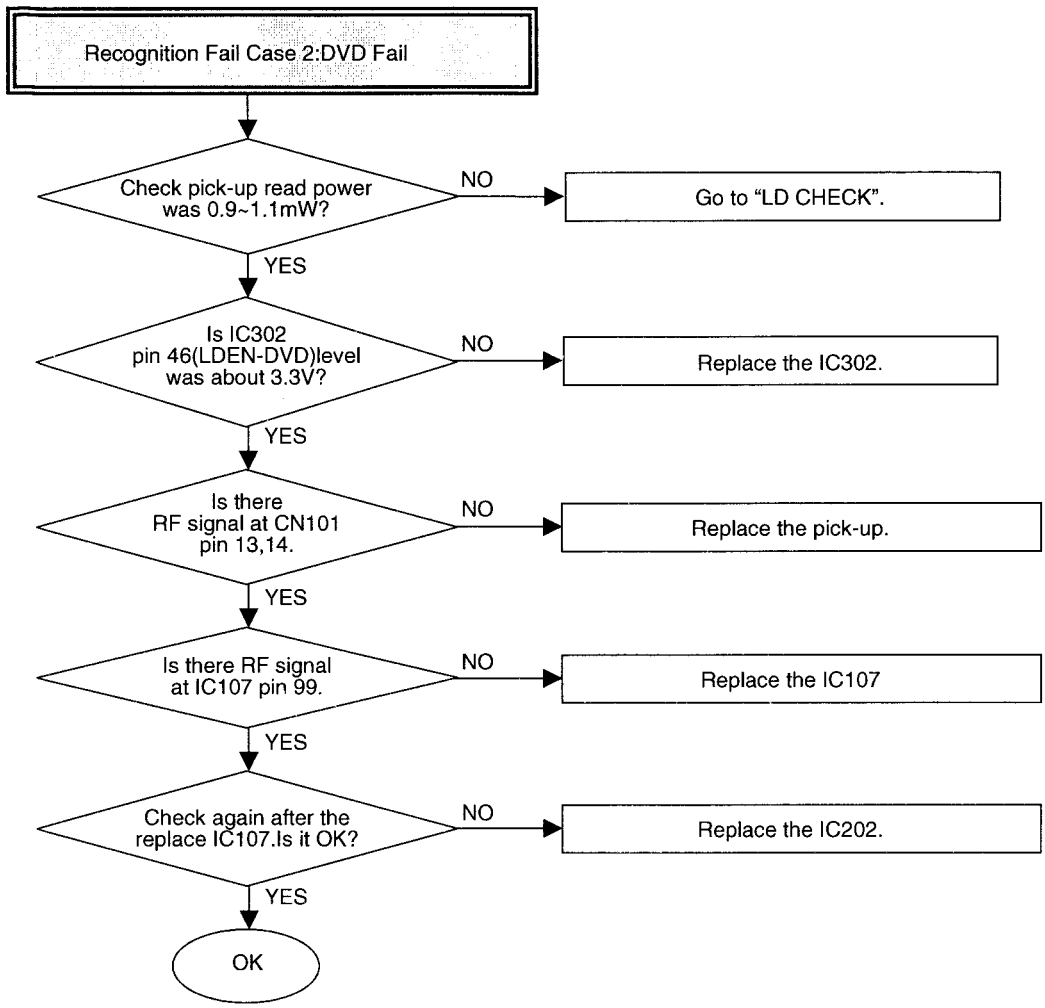

Spindle operating is abnormal
Is there spindle control signal input? (IC105 pin 24)
NO
Is there spindle control DSP output(IC202 pin 145)?
NO
YES
YES
•Check the R147,R149.
•Replace the IC106
Replace the IC202.
Is there spindle drive voltage output? (IC105 pin 9,11,18)
NO
Is there SFG signal input? (IC302 pin 28)
NO
YES
YES
OK
Replace the Spindle Motor
•Check the connection of IC105 pin 21.
•Check the connector CN103.
•Replace the IC105.

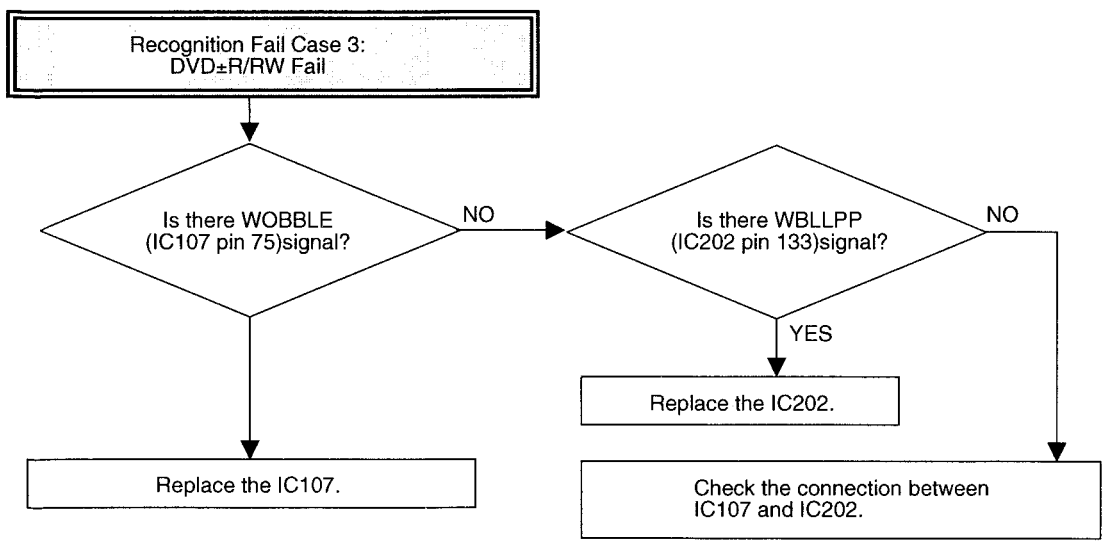

Focus Servo is unstable
Is FE signal output normal in Focusing Up/Down? (IC107 pin 86)
NO
Replace the IC107.
YES
Is FDRV signal output normal in Focusing Up/Down? (IC202 pin 146)
NO
•Check the R158.
•Replace the IC107.
YES
Go to "Focus Actuator operating is abnormal"

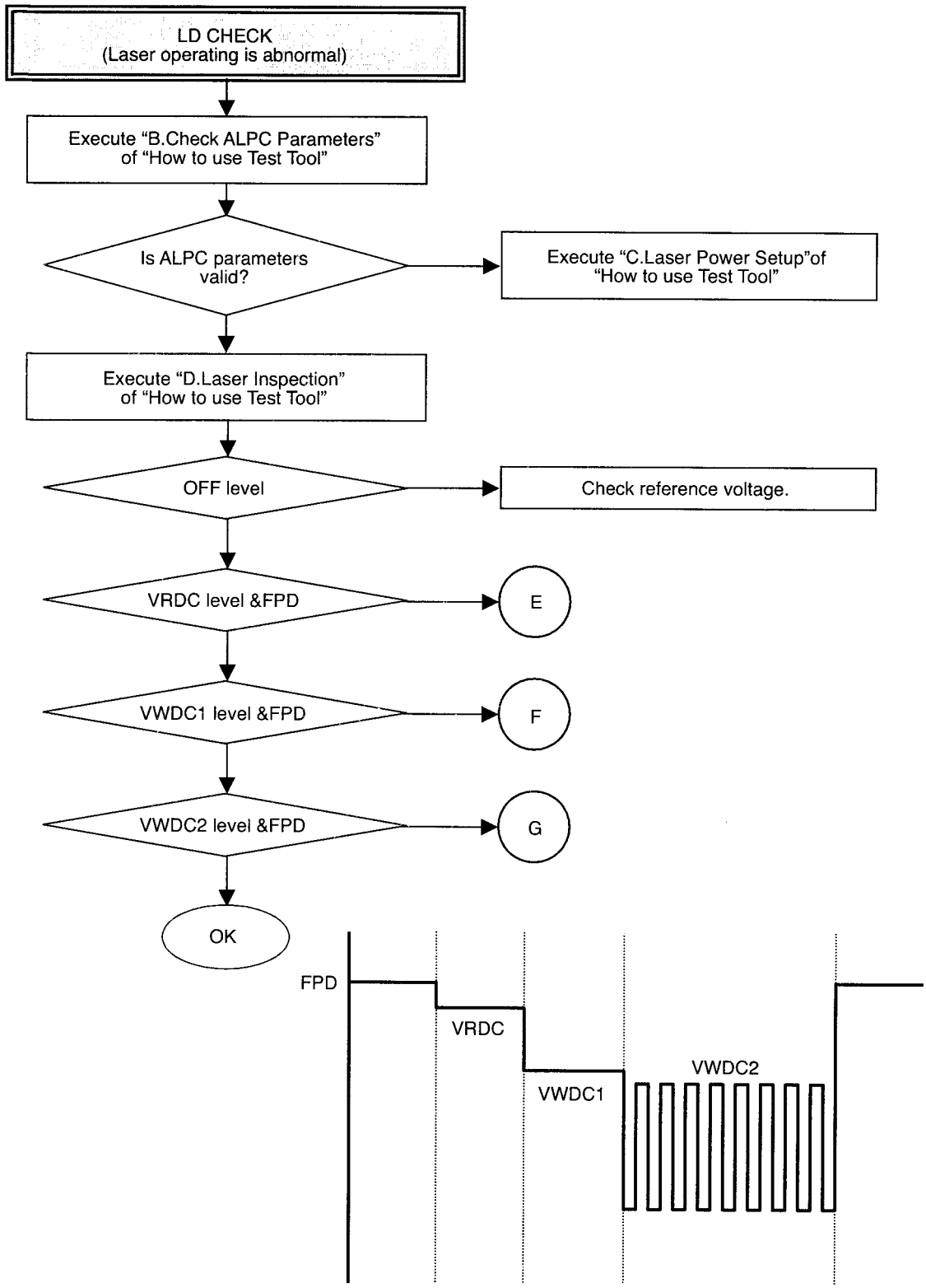

Focus Actuator operating is abnormal.
Is there focus search control signal input? (IC105 pin 53)
NO
• Check the connection of IC202 pin 146.
• Check the communication line between IC106 and IC202.
• Replace the IC106.
YES
Is there focus search drive voltage output? (IC105 pin 45,46)
NO
Is DRV-CTRL1 signal "H"? (IC105 pin 23)
NO
YES
YES
•Check the connection CN101 pin 35,36.
•Check the connector CN101.
Replace the IC105.
Replace the pick-up.
• Check the connection of IC302.
• Replace the IC302.

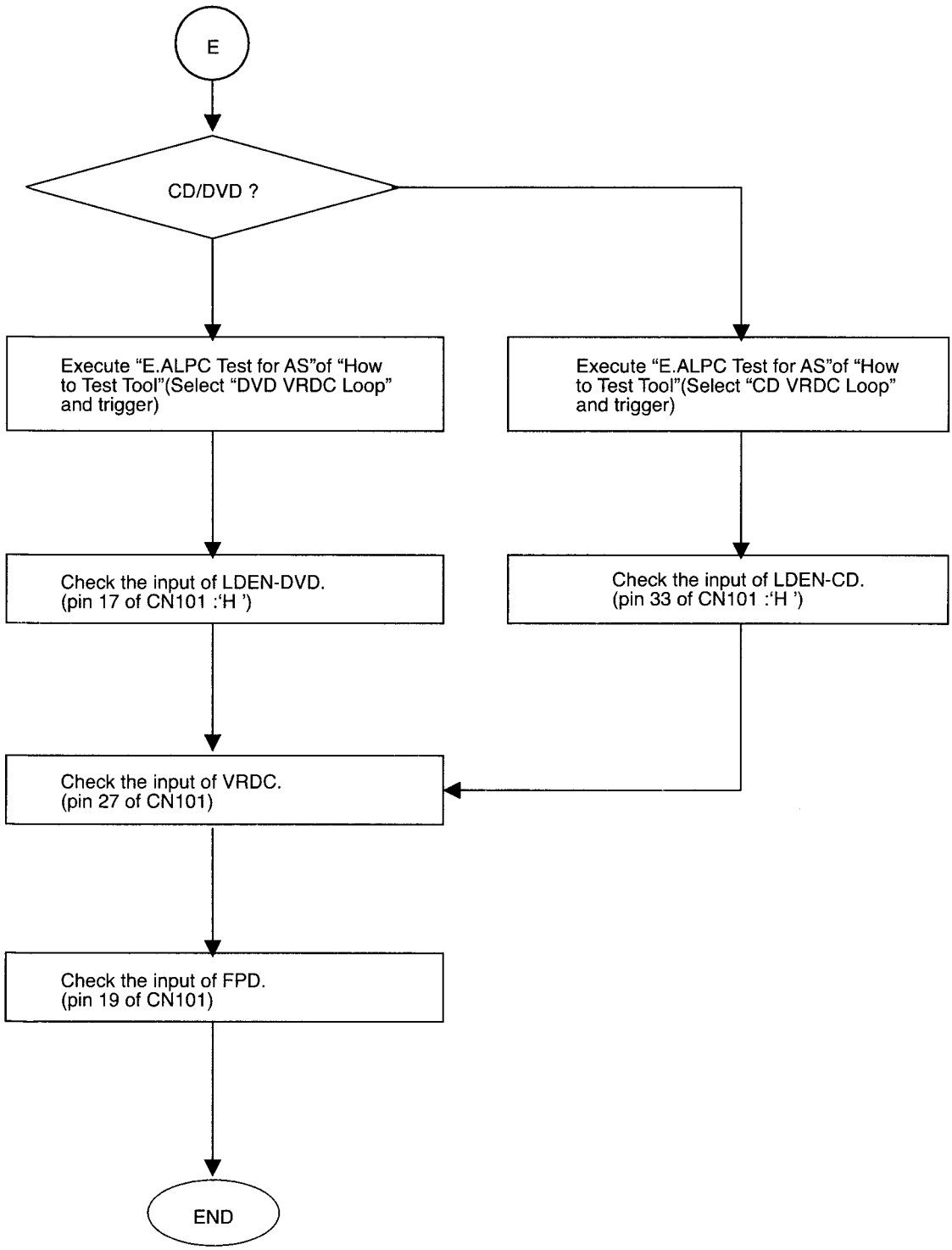

Track Servo is unstable
Is TE signal output normal in focusing ON and tracking OFF? (IC107 pin 82)
NO
Is pick-up (E, F, G, H)output normal? (CN101 pin 5, 8, 9, 12)
NO
YES
YES
Replace the IC107.
•Check the pick-up FFC.
•Replace the pick-up.
Is TE signal input normal in focusing ON and tracking OFF? (IC202 pin 139)
NO
Check the connection between IC202(pin139)and IC107(pin 82).
YES
Is there TDRV signal output in tracking ON? (IC202 pin 147)
NO
Replace the IC202.
YES
Check the IC105 and pick-up referring to "Focus Actuator operating is abnormal".

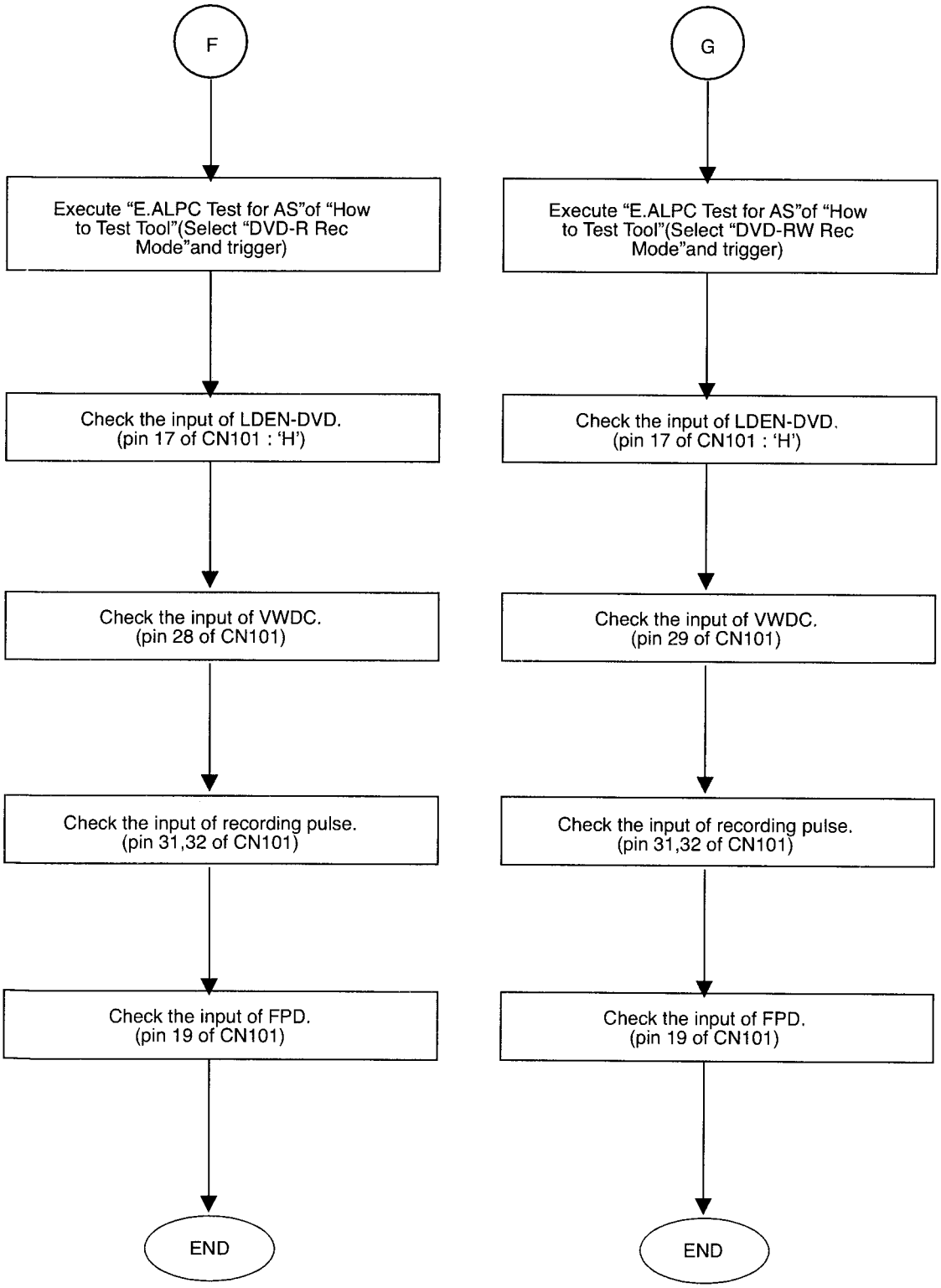

Recognition Fail Case 1:
CD-ROM Fail
Check pick-up read power is 0.9~1.3mW?
NO
Go to "LD CHECK".
YES
Does focus servo operate normally?
NO
Go to "Focus Servo is unstable".
YES
Check pick-up RF signal IC107(Pin115) RFO(TP115)is 500~1000mVpp?
NO
•Check the pick-up FFC and CN101.
•Replace the pick-up unit.
YES
Check RFEQO waveform (IC107 Pin 99)is 800~1200mVpp?
NO
Replace the IC107
YES
Check after replacing IC202. Is it OK?
NO
Go to "Tracking Servo is unstable".
YES
OK

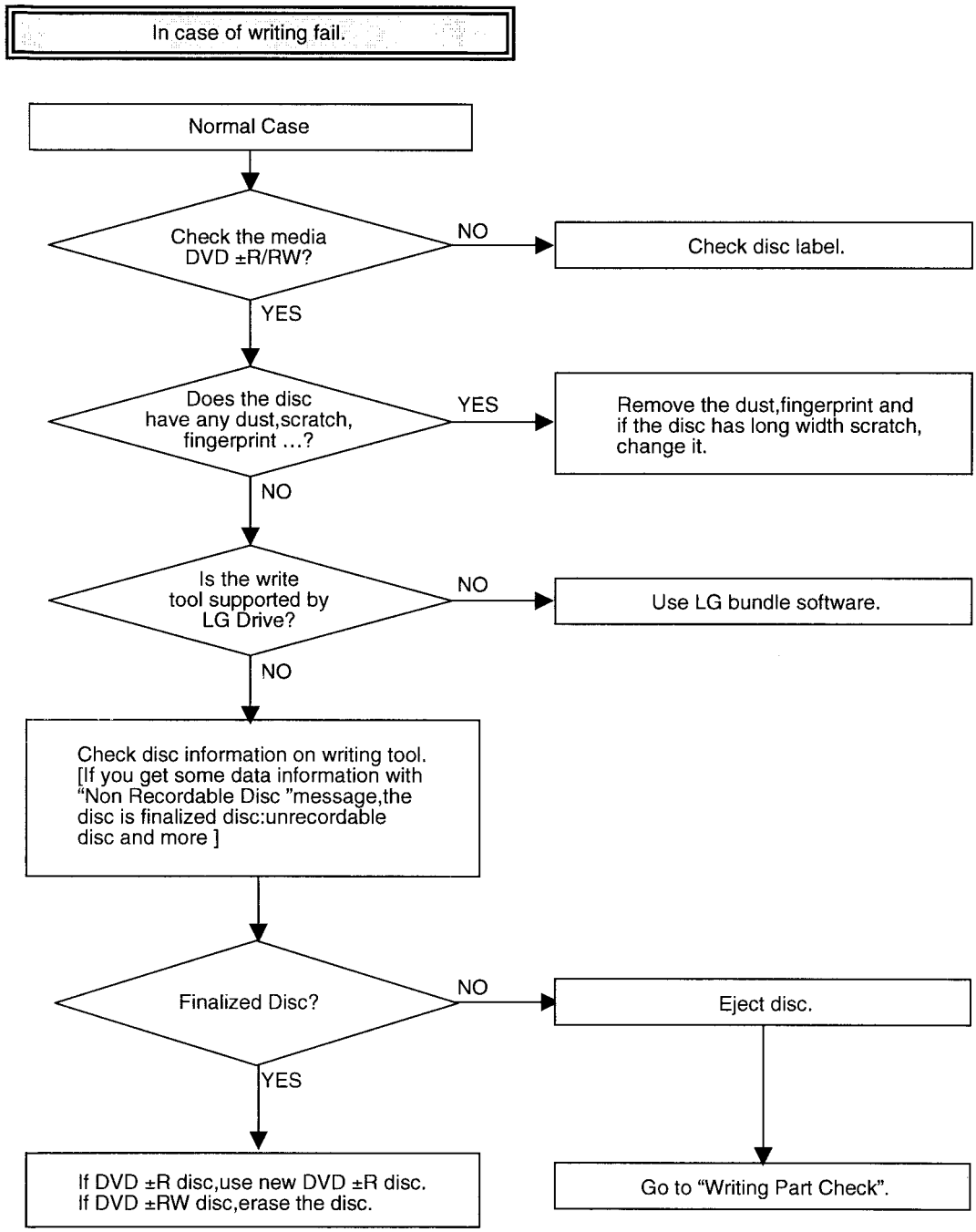

Recognition Fail Case 2:DVD Fail
Check pick-up read power was 0.9~1.1mW?
NO
Go to "LD CHECK".
YES
Is IC302 pin 46(LDEN-DVD)level was about 3.3V?
NO
Replace the IC302.
YES
Is there RF signal at CN101 pin 13,14.
NO
Replace the pick-up.
YES
Is there RF signal at IC107 pin 99.
NO
Replace the IC107
YES
Check again after the replace IC107.Is it OK?
NO
Replace the IC202.
YES
OK

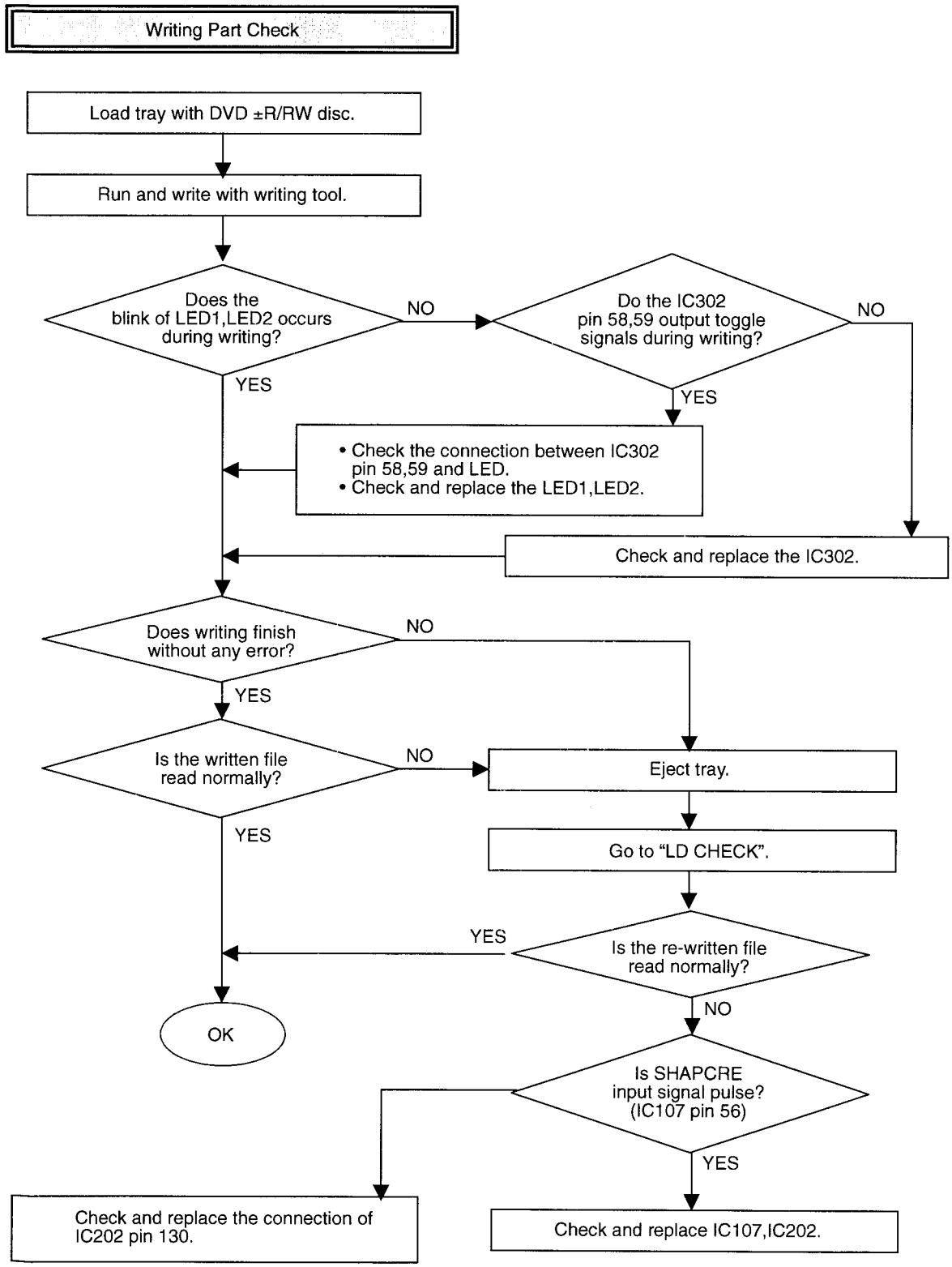

Recognition Fail Case 3: DVD±R/RW Fail
Is there WOBBLE (IC107 pin 75)signal?
NO
Is there WBLLPP (IC202 pin 133)signal?
NO
YES
Replace the IC202.
Replace the IC107.
Check the connection between IC107 and IC202.


LD CHECK
(Laser operating is abnormal)
Execute "B.Check ALPC Parameters" of "How to use Test Tool"
Is ALPC parameters valid?
Execute "C.Laser Power Setup"of "How to use Test Tool"
Execute "D.Laser Inspection" of "How to use Test Tool"
OFF level
Check reference voltage.
VRDC level &FPD
E
VWDC1 level &FPD
F
VWDC2 level &FPD
G
OK
FPD
VRDC
VWDC1
VWDC2


E
CD/DVD ?
Execute "E.ALPC Test for AS"of "How to Test Tool"(Select "DVD VRDC Loop" and trigger)
Execute "E.ALPC Test for AS"of "How to Test Tool"(Select "CD VRDC Loop" and trigger)
Check the input of LDEN-DVD. (pin 17 of CN101 :'H ')
Check the input of LDEN-CD. (pin 33 of CN101 :'H ')
Check the input of VRDC. (pin 27 of CN101)
Check the input of FPD. (pin 19 of CN101)
END

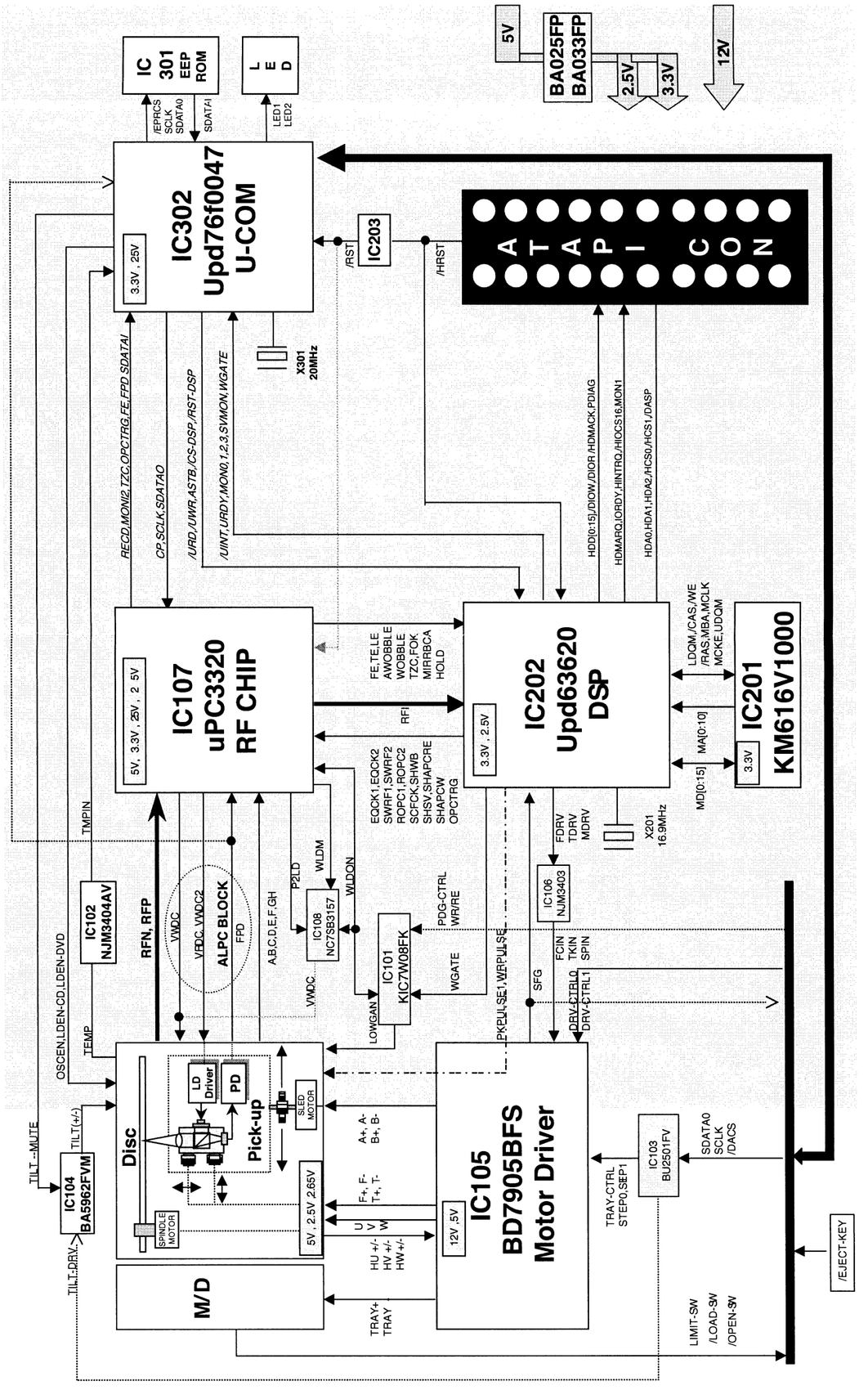

F
Execute "E.ALPC Test for AS"of "How to Test Tool"(Select "DVD-R Rec Mode"and trigger)
Check the input of LDEN-DVD. (pin 17 of CN101 : 'H')
Check the input of VWDC. (pin 28 of CN101)
Check the input of recording pulse. (pin 31,32 of CN101)
Check the input of FPD. (pin 19 of CN101)
END
G
Execute "E.ALPC Test for AS"of "How to Test Tool"(Select "DVD-RW Rec Mode"and trigger)
Check the input of LDEN-DVD. (pin 17 of CN101 : 'H')
Check the input of VWDC. (pin 29 of CN101)
Check the input of recording pulse. (pin 31,32 of CN101)
Check the input of FPD. (pin 19 of CN101)
END


In case of writing fail.
Normal Case
Check the media DVD ±R/RW?
NO
Check disc label.
YES
Does the disc have any dust,scratch, fingerprint ...?
YES
Remove the dust,fingerprint and if the disc has long width scratch, change it.
NO
Is the write tool supported by LG Drive?
NO
Use LG bundle software.
NO
Check disc information on writing tool. [If you get some data information with "Non Recordable Disc "message,the disc is finalized disc:unrecordable disc and more]
Finalized Disc?
NO
Eject disc.
YES
If DVD ±R disc,use new DVD ±R disc. If DVD ±RW disc,erase the disc.
Go to "Writing Part Check".


Writing Part Check
Load tray with DVD ±R/RW disc.
Run and write with writing tool.
Does the blink of LED1,LED2 occurs during writing?
NO
Do the IC302 pin 58,59 output toggle signals during writing?
NO
YES
YES
• Check the connection between IC302 pin 58,59 and LED.
• Check and replace the LED1,LED2.
Check and replace the IC302.
Does writing finish without any error?
NO
YES
Is the written file read normally?
NO
Eject tray.
YES
Go to "LD CHECK".
YES
Is the re-written file read normally?
NO
OK
Is SHAPCRE input signal pulse? (IC107 pin 56)
YES
Check and replace the connection of IC202 pin 130.
Check and replace IC107,IC202.

BLOCK DIAGRAMS & DESCRIPTION

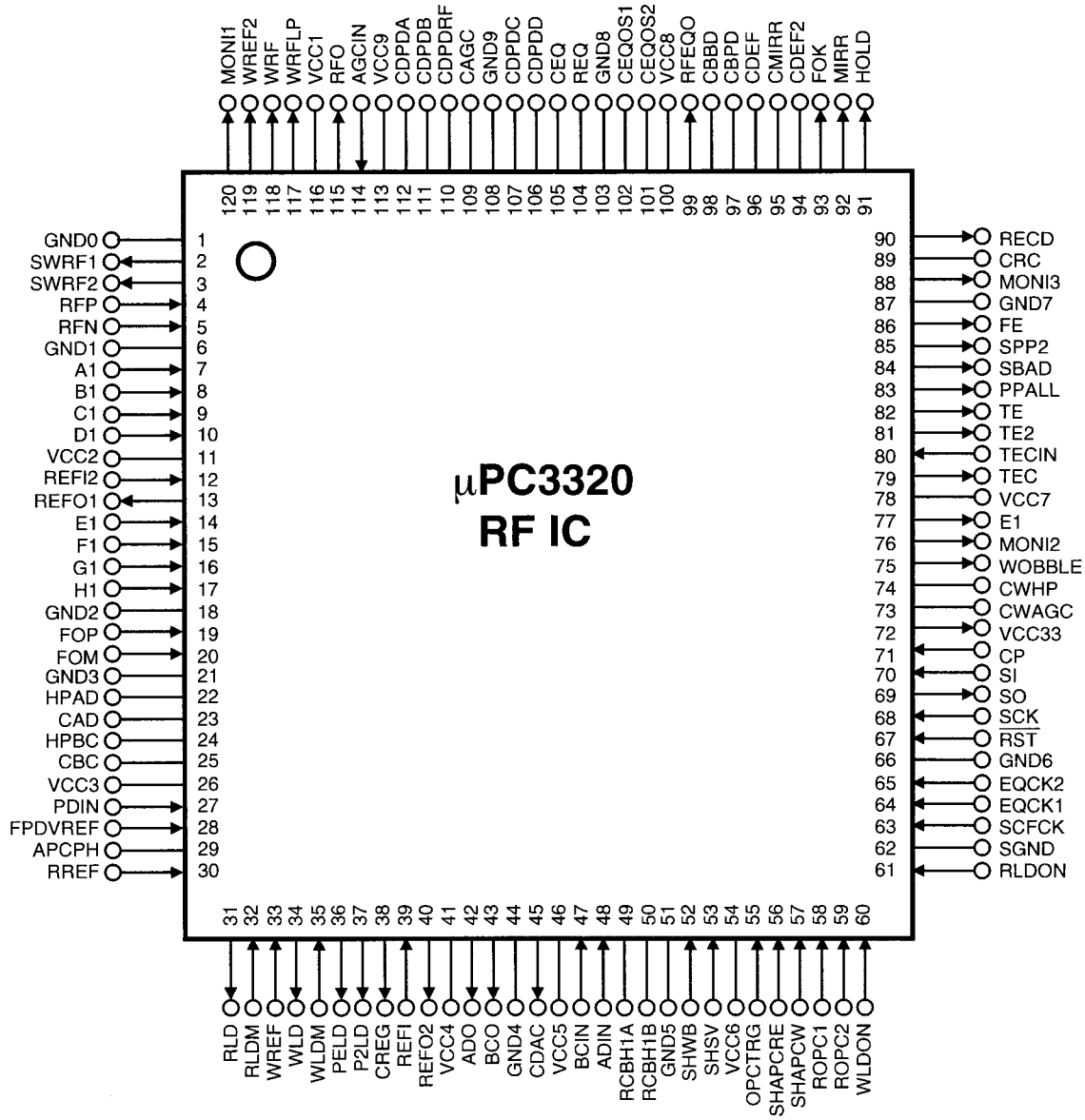
1. Overall Block Diagram



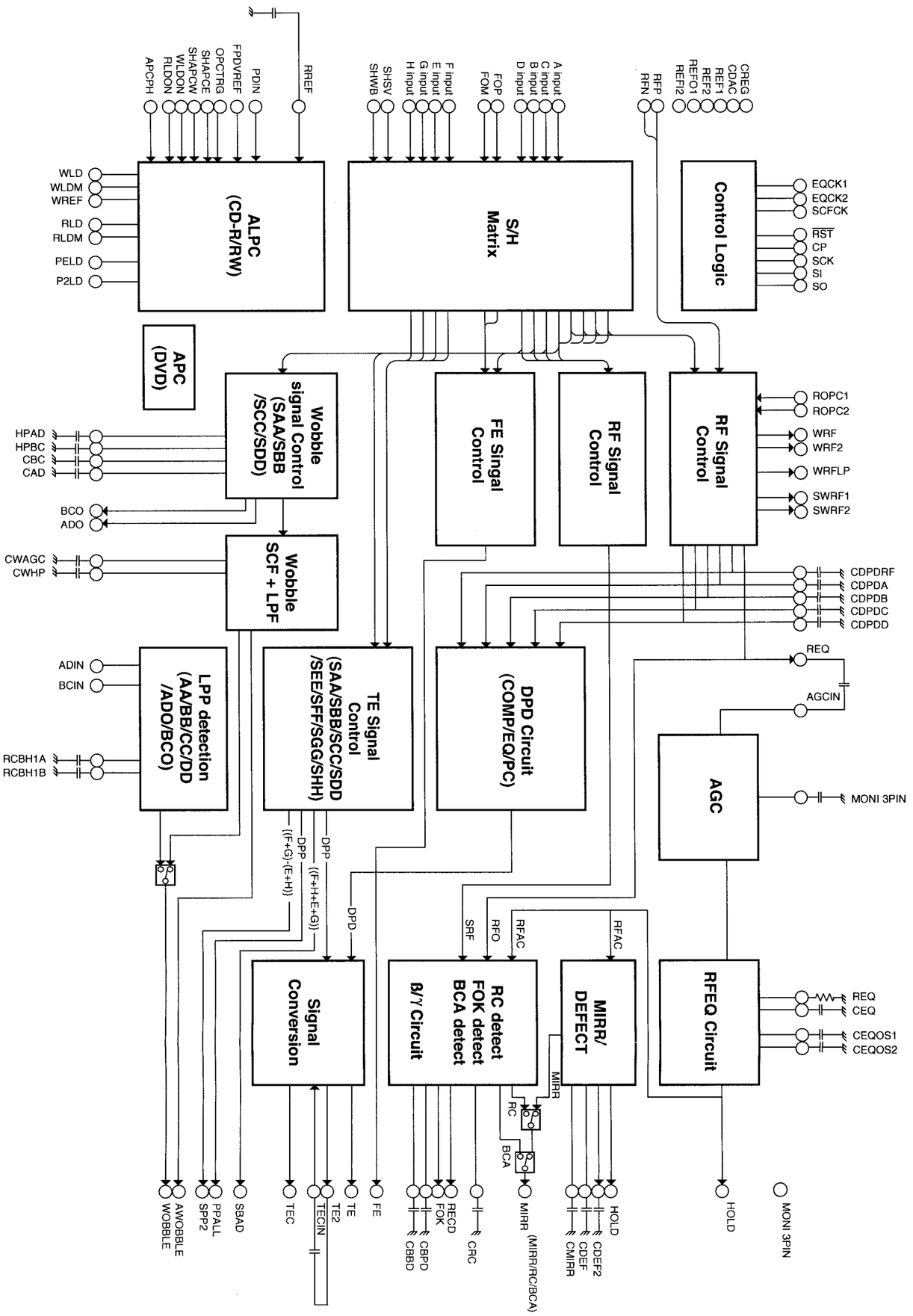
2. MAJOR IC INTERNAL BLOCK DIAGRAM AND PIN DESCRIPTION

IC101 (μPC3320) : RF Signal Processor for CD/DVD

Pin Assignment



Block Diagram



Pin description

No.	Pin Name	Type	Description
1	GND0	-	Analog GND
2	SWRF1	OUTPUT	WRF signal sampling & hold [S/H] signal output.
3	SWRF1	OUTPUT	WRF signal sampling & hold [S/H] signal output.
4	RFP	INPUT	RF differerential signal[+] input.
5	RFN	INPUT	RF differerential signal[-] input.
6	GND1	-	Analog GND
7	A1	INPUT	Main beam signal [A1] input.
8	B1	INPUT	Main beam signal [B1] input.
9	C1	INPUT	Main beam signal [C1] input.
10	D1	INPUT	Main beam signal [D1] input.
11	VCC2	-	Analog power.
12	REFI2	INPUT	Reference voltage input pin for PDIC.
13	REFO1	OUTPUT	Pick-up internal reference voltage output[at REFI pin 2.5V: 2.25V output.]
14	E1	INPUT	Sub beam signal [E1] input.
15	F1	INPUT	Sub beam signal [F1] input.
16	G1	INPUT	Sub beam signal [G1] input.
17	H1	INPUT	Sub beam signal [H1] input.
18	GND2	-	Analog GND
19	FOP	INPUT	FO+ signal input for Focus.
20	FOM	INPUT	FO- signal input for Focus.
21	GND3	-	Analog GND
22	HPAD	-	Wobble circuit HPF band setting condenser connecting port.
23	CAD	-	Wobble circuit AGC response time setting condenser connecting port.
24	HPBC	-	Wobble circuit HPF band setting condenser connecting port.
25	CBC	-	Wobble circuit AGC response time setting condenser connecting port.
26	VCC3	-	Analog power.
27	PDIN	INPUT	Laser monitor current input.
28	FPDVREF	INPUT	Reference voltage input pin for front monitor.
29	APCPH	-	Peak-hold condenser connecting pin for ALPC .
30	RREF	-	Read ALPC Condenser connecting port.
31	RLD	OUTPUT	Read Laser drive control output.
32	RLDM	INPUT	Read Laser drive control Amp[-] input.
33	WREF	-	Write ALPC Condenser connecting port.
34	WLD	OUTPUT	Write Laser drive control output.
35	WLDM	INPUT	Write Laser drive control Amp[-] input.
36	PELD	OUTPUT	Pick power output port1.
37	P2LD	OUTPUT	Pick power output port 2.
38	CREG	OUTPUT	Regulater voltage[2.5V] output.
39	REF1	INPUT	DSP power voltage input[2.5V].
40	REFO2	OUOTPTU	DSP Reference voltage output [at REFI port 2.5V: 1.5V output].

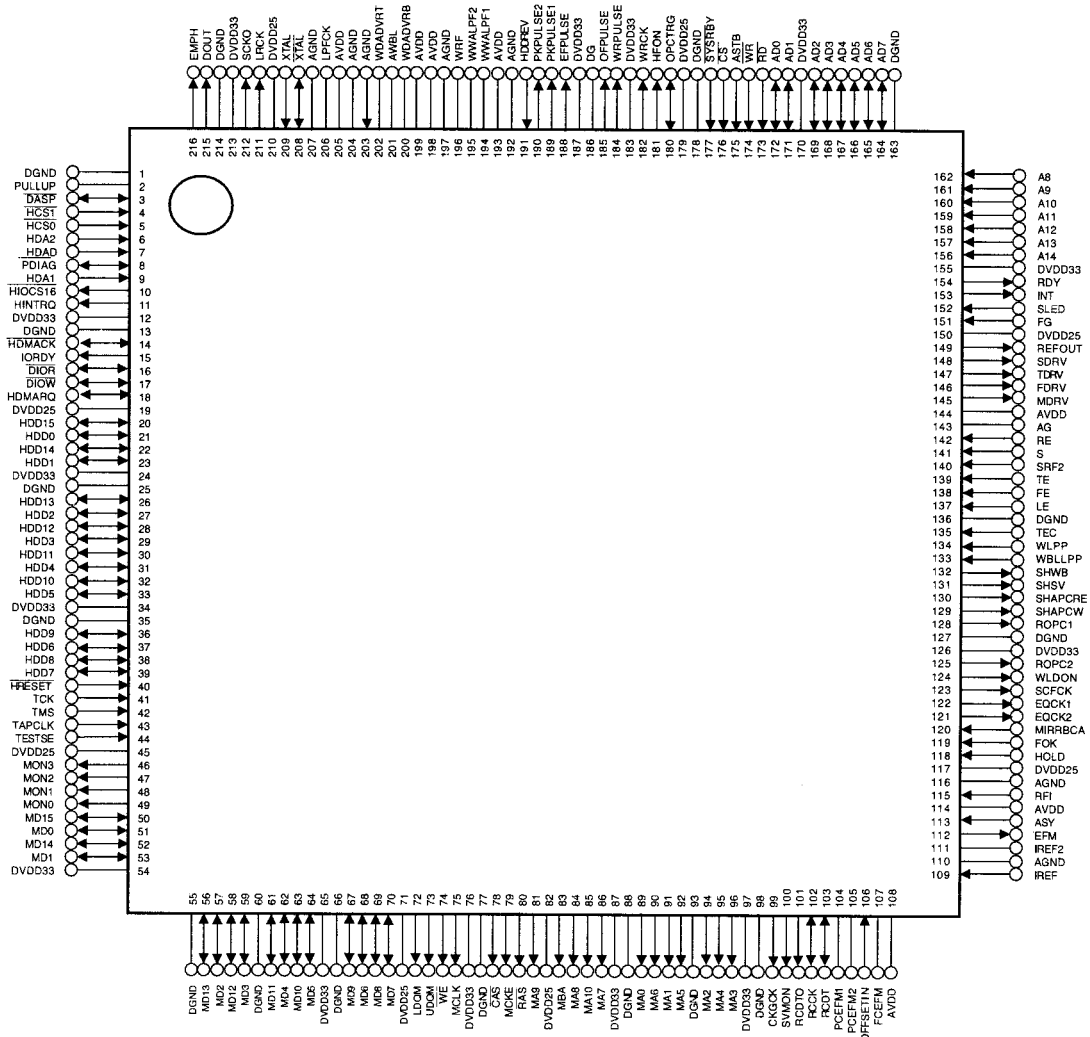
No.	Pin Name	Type	Description
41	VCC4	-	Analog power.
42	ADO	OUTPUT	Wobble circuit [A+D] signal output.
43	BCO	OUTPUT	Wobble circuit [B+C] signal output.
44	GND4	-	Analog GND
45	CDAC	OUTPUT	DAC reference voltage output.
46	VCC5	-	Digital power.
47	BCIN	INPUT	[B+C] signal input.
48	ADIN	INPUT	[A+D] signal input.
49	RCBH1A	-	RLPP circuit bottom hold condenser connecting port.
50	RCBH1B	-	RLPP circuit bottom hold condenser connecting port.
51	GND5	-	Analog GND
52	SHWB	INPUT	Sample hold pulse input for Wobble signal.
53	SHSV	INPUT	Sample hold pulse input for Servo signal.
54	VCC6	-	Digital power.
55	OPCTRG	INPUT	OPCTRG signal input.
56	SHAPCRE	INPUT	Sample hold pulse input for Read/Erase ALPC.
57	SHPCW	INPUT	Sample hold pulse input fot Write ALPC.
58	ROPC1	INPUT	Sample hold pulse input 1 for WRF signal.
59	ROPC2	INPUT	Sample hold pulse input 2 for WRF signal.
60	WLDON	INPUT	Write ALPC Center signal input.
61	RLDON	INPUT	Read ALPC Center signal input.
62	SGND	-	Sub straight GND.
63	SCFCK	INPUT	SCF clock input.
64	EQCK1	INPUT	Fixed clock input.
65	EQCK2	INPUT	Equalize automatic control clock input.
66	GND6	-	Analog GND
67	RST	INPTU	Register reset input.
68	SCK	INPUT	Register setting clock input.
69	SO	OUTPUT	Serial data output.
70	SI	INPUT	Serial data input.
71	CP	INPUT	Address
72	VCC33	OUTPUT	Power voltage [3.3V monitor].
73	CWAGC	-	Wobble circuit AGC response time setting condenser connecting port.
74	CWHP	-	Wobble circuit HPF band setting condenser connecting port.
75	WOBBLE	OUTPUT	Wobble signal output [Digital signal].
76	AWOBBLE	OUTPUT	Wobble signal output [Analog signal].
77	MONI2	OUTPUT	Internal signal monitor port.
78	VCC7	-	Digital power.
79	TEC	OUTUPT	Tracking zero cross signal output.
80	TECIN	INPUT	Tracking zero cross signal input.

No.	Pin Name	Type	Description
81	TE2	OUTPUT	Tracking error signal output.
82	TE	OUTPUT	Tracking error signal output for Servo.
83	PPALL	OUTPUT	Main side push-pull signal output.
84	SBAD	OUTPUT	Sub beam signal output [(E+F+G+H) signal].
85	SPP2		Sub beam signal output [(F+G)-(E+H) signal].
86	FE	OUTPUT	Focus error signal.
87	GND7	-	Analog GND
88	MONI3	OUTPUT	Internal signal monitor port.
89	CRC	-	Radial contrast circuit condenser connecting port.
90	RECD	OUTPUT	No recording area detection.
91	HOLD	OUTPUT	Detection signal output.
92	MIRR	OUTPUT	Mirror detection/RCA signal output.
93	FOK	OUTPUT	Focus OK signal.
94	CDEF2	-	Detect circuit condenser connecting port 2.
95	CMIRR	-	Mirror circuit condenser connecting port.
96	CDEF	-	Detect circuit condenser connecting port .
97	CBPD	-	β, γ adetection[peak]condenser connecting port.
98	CBBD	-	β, γ adetection[buttom]condenser connecting port.
99	RFEQO	OUTPUT	Equalizer output.
100	VCC8	-	Analog power.
101	CEQOS2	-	RF Equalizer circuit condenser connecting port 2.
102	CEQOS1	-	RF Equalizer circuit condenser connecting port 1.
103	GND8	-	Analog GND
104	REQ	-	RF Equalizer circuit volatage setting resistance connecting port.
105	CEQ	-	Equalizer fc automatic control curcuit condenser connecting port.
106	CDPDD	-	DPD [D signal] HPF band setting condenser connecting port.
107	CDPDC	-	DPD [C signal] HPF band setting condenser connecting port.
108	GND9	-	Analog GND
109	CDPDC	-	RFAGC circuit condenser connecting port.
110	CDPDRF	-	DPD [RF signal] HPF band setting condenser connecting port.
111	CDPDRF	-	DPD [B signal] HPF band setting condenser connecting port.
112	CDPDA	-	DPD [A signal] HPF band setting condenser connecting port.
113	VCC9	-	Analog power.
114	AGCIN	INPTU	AGC input
115	RFO	OUTPUT	Read RF signal output.
116	VCC1	-	Analog power.
117	WRFLP	OUTPUT	Write RF LPF output.
118	WRF	OUTPUT	Write RF signal output.
119	WFR2	OUTPUT	Write RF2 signal output.
120	MONI1	OUTPUT	Internal signal monitor port.

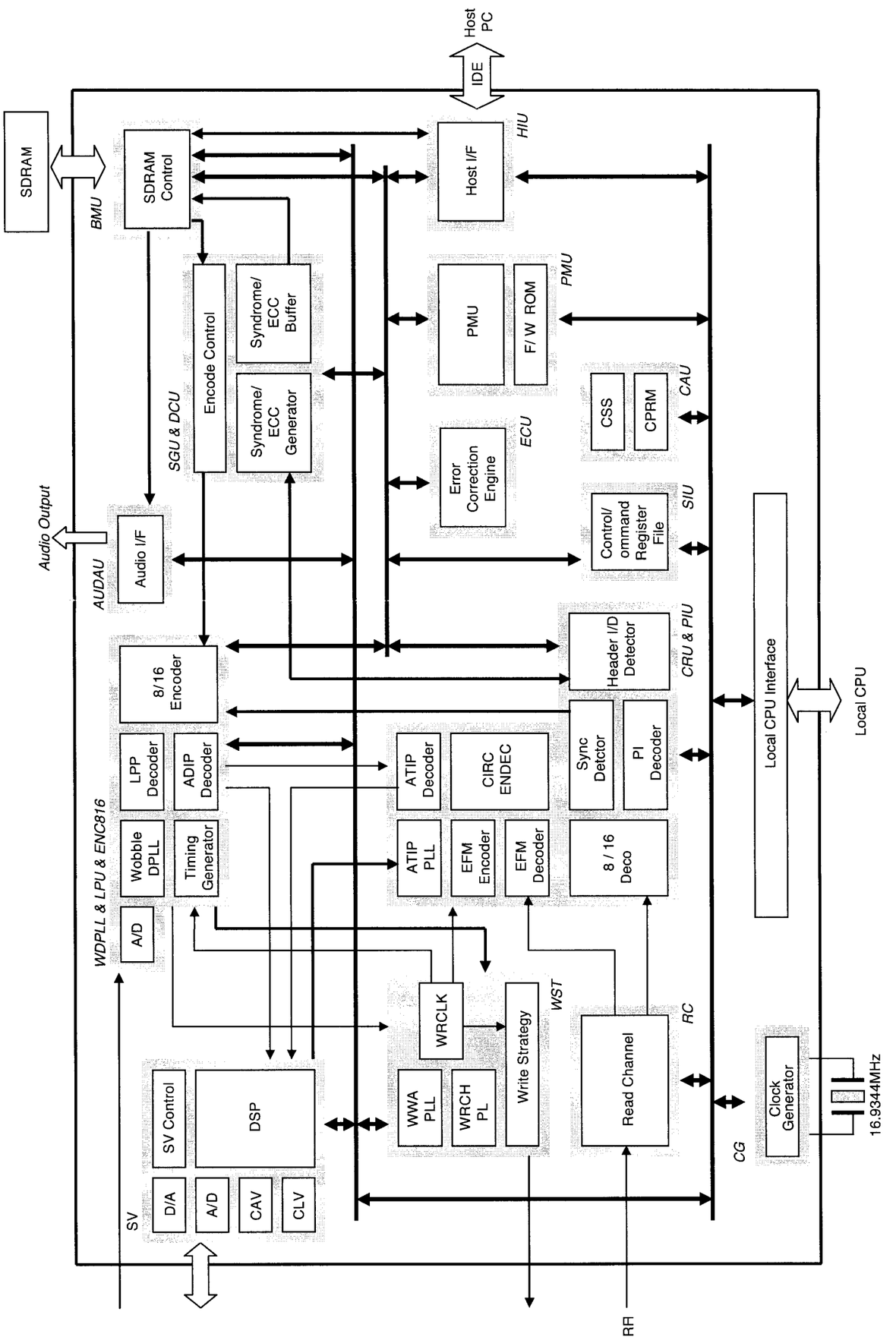
3. MAJOR IC INTERNAL BLOCK DIAGRAM AND PIN DESCRIPTION

IC201(μPD63620) : Encoder, Decoder & DSP Signal Processor

Pin Assignment



Block Diagram



Pin description

Pin No.	Pin Name		Type		Description
1	DGND	-	-	-	Digital GND
2	PULLUP	-	-	-	Pull-up resistance connecting port.[5V or 3.3V]
3	$\overline{\text{DASO}}$	5V_tolerant	I/O	Pull-up	Drive active slave presesnt signal.[open/drain]
4	$\overline{\text{HCS1}}$	5V_tolerant	I	-	Host interface chip, pull-up selection input.
5	$\overline{\text{HCS0}}$	5V_tolerant	I	-	Host interface chip, pull-up selection input.
6	HDA2	5V_tolerant	I	-	Host interface chip, address signal input.
7	HDAO	5V_tolerant	I	-	Host interface chip, address signal input.
8	$\overline{\text{PDIAG}}$	5V_tolerant	I/O	Pull-up	Diagnostic signal [open/drain]
9	HDA1	5V_tolerant	I	-	Host interface chip, address signal input.
10	$\overline{\text{HIOCS16}}$	5V_tolerant	I	Pull-up	16 bit I/O signal [open/drain]. When Ultra DMA burst, this is 3 state port.
11	HINTRQ	5V_tolerant	O	Pull-up	Host interrupt signal output.
12	DVDD33	-	-	-	Digital power[3.3V]
13	DGND	-	-	-	Digital GND
14	$\overline{\text{HDMACK}}$	5V_tolerant	I/O	-	DMA acknowledge signal.
15	IORDY	5V_tolerant	I	Pull-up	I/O Channel ready[open/drain]. When Ultra DMA burst, this is DDMARDY: DSTROBE signal.
16	$\overline{\text{DIOR}}$	5V_tolerant	I/O	-	Host interface read input signal. When Ultra DMA burst, this is HDMARDY: HSTROBE signal.
17	$\overline{\text{DIOW}}$	5V_tolerant	I/O	-	Host interface write input signal. When Ultra DMA burst, this is STOP signal.
18	HDMARQ	5V_tolerant	O	Pull-up	DMA request signal output.
19	DVDD25	-	-	-	Digital power[2.5V]
20	HDD15 HDD8	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
21	HDD0 HDD6	5V_tolerant	O	Pull-up	Host interface data bus.[within slave resistance]
22	HDD14 HDD9	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
23	HDD1	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
24	DVDD33	-	-	-	Digital power[3.3V]
25	DGND	-	-	-	Digital GND
26	HDD13 HDD10	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
27	HDD2 HDD4	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]

Pin No.	Pin Name		Type		Description
28	DGND HDD4	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance
29	HDD3 HDD3	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
30	HDD11 HDD12	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
31	HDD4 HDD2	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance
32	HDD7 HDD13	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance]
33	HDD7 HDD1	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance].
34	DVDD33	-	-	-	Digital power[3.3V]
35	DGND	-	-	-	Digital GND
36	HDD9 HDD14	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance].
37	HDD6 HDD0	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance].
38	HDD8 HDD15	5V_tolerant	I/O	Pull-up	Host interface data bus.[within slave resistance].
39	HDD7	5V_tolerant	I/O	Pull-up	Host interface data bus.
40	$\overline{\text{HRESET}}$	5V_tolerant	I/O	-	Host reset input.
41	TCK	3V	I	-	Test port. It must be connected to DGND.
42	TMS	3V	I	-	Test port. It must be connected to DGND.
43	TAPCLK	3V	I	-	Test port. It must be connected to DGND.
44	TESTSE	3V	I	-	Test port. It must be connected to DGND.
45	DVDD25	-	-	-	Digital power[2.5V]
46	MON3	3V	O	L	Monitor: test signal.
47	MON2	3V	O	L	Monitor: test signal.
48	MON1	3V	I/O	L	Monitor: test signal.
49	MON0	3V	I/O	L	Monitor: test signal.
50	MD15	3V	I/O	Pull-up	Buffer memory , Interface data bus.
51	MD0	3V	I/O	Pull-up	Buffer memory , Interface data bus.
52	MD14	3V	I/O	Pull-up	Buffer memory , Interface data bus.
53	MD1	3V	I/O	Pull-up	Buffer memory , Interface data bus.
54	DVDD33	-	-	-	Digital power.[3.3V](Buffer. Memory. Block)

Pin No.	Pin Name		Type		Description
55	DGND	-	-	-	Digital GND.(Buffer. Memory. Block)
56	MD13	3V	I/O	Pull-up	Buffer memory , Interface data bus.
57	MD2	3V	I/O	Pull-up	Buffer memory , Interface data bus.
58	MD12	3V	I/O	Pull-up	Buffer memory , Interface data bus.
59	MD3	3V	I/O	Pull-up	Buffer memory , Interface data bus.
60	DGND	-	-	-	Digital GND.
61	MD11	3V	I/O	Pull-up	Buffer memory , Interface data bus.
62	MD4	3V	I/O	Pull-up	Buffer memory , Interface data bus.
63	MD10	3V	I/O	Pull-up	Buffer memory , Interface data bus.
64	MD5	3V	I/O	Pull-up	Buffer memory , Interface data bus.
65	DVD33	-	-	-	Digital power.[3.3V](Buffer. Memory. Block)
66	DGND	-		-	Digital GND.(Buffer. Memory. Block)
67	MD9	3V	I/O	Pull-up	Buffer memory , Interface data bus.
68	MD6	3V	I/O	Pull-up	Buffer memory , Interface data bus.
69	MD8	3V	I/O	Pull-up	Buffer memory , Interface data bus.
70	MD7	3V	I/O	Pull-up	Buffer memory , Interface data bus.
71	DVDD25	-	-	-	Digital power.[2.5V]
72	LDQM	3V	O	H	Low byte, data input/output mask control signal.
73	UDQM	3V	O	H	High byte, data input/output mask control signal.
74	WE	3V	O	H	Buffer memory , Interface write enable signal.
75	MCLK	3V	O	Pull-up	SDRAM clock output.
76	DVDD33	-	-	-	Digital power.[3.3V](Buffer. Memory. Block)
77	DGND	-	-	-	Digital GND.(Buffer. Memory. Block)
78	$\overline{CAS}$	3V	O	H	Buffer memory , Interface column address strobe control signal.
79	MCKE	3V	O	H	SDRAM clock enable control signal.
80	$\overline{RAS}$	3V	O	H	Buffer memory , Interface row address strobe control signal.
81	MA9	3V	O	L	Buffer memory , Interface address bus.
82	DVDD25	-	-	-	Digital power.[2.5V]
83	MBA	3V	O	L	Buffer memory , Interface bank address signal.
84	MA8	3V	O	L	Buffer memory , Interface data bus.
85	MA10	3V	O	L	Buffer memory , Interface data bus.
86	MA7	3V	O	L	Buffer memory , Interface data bus.
87	DVDD33	-	-	-	Digital power.[3.3V](Buffer. Memory. Block)

Pin No.	Pin Name		Type		Description
88	DGND	-	-	-	Buffer memory , Interface data bus.
89	MA0	3V	O	H	Buffer memory , Interface data bus.
90	MA6	3V	O	L	Buffer memory , Interface data bus.
91	MA1	3V	O	L	Buffer memory , Interface data bus.
92	MA5	3V	O	L	Buffer memory , Interface data bus.
93	DGND	-	-	-	Digital GND
94	MA2	3V	O	L	Buffer memory , Interface data bus
95	MA4	3V	O	L	Buffer memory , Interface data bus.
96	MA3	3V	O	L	Buffer memory , Interface data bus.
97	DVDD3	-	-	-	Digital power.[3.3V](Buffer. Memory. Block)
98	DGND	-	-	-	Digital GND (Buffer. Memory. Block)
99	CKGCK	3V	O		Clock, Generator output.
100	SVMON	3V	O	L	Servo, block monitor signal output.
101	RCDTO	3V	O	L	Read channel data output.
102	RCCK	3V	I/O	Hi-Z	Read channel clock output.
103	RCDT	3V	I/O	Hi-Z	Read channel data output.
104	PCEFM1	Analog	-	-	Read channel phase discriminator condenser connecting port.
105	PCEFM2	Analog	-	-	Read channel phase discriminator condenser connecting port.
106	OFFSETIN	Analog	-	-	Read channel phase discriminator charge pump control port.
107	FCEFM	Analog	-	-	Read channel frequency discriminator condenser connecting port.
108	AVDD	-	-	-	Analog power[2.5V]
109	IREF	Analog	o	-	Read channel analog reference voltage input.
110	AGND	-	-	-	Analog GND[EFM PLL]
111	IREF2	Analog	O	-	Non connecting port.
112	EFM	Analog	O	Pull-up	EFM comparator output.
113	ASY	Analog	O	-	EFM comparator asymmetry control voltage input.
114	AVDD	-	-	-	Analog power[2.5V]
115	RFI	Analog	O		EFM comparator RF signal input.
116	AGND	-	-	-	Analog GND[EFM]
117	DVDD25	-	-	-	Digital power.[2.5V]
118	HOLD	3v	O	-	HOLD control signal input.
119	FOK	3v	O	-	FOK signal input.
120	MIRRBCA	3V	O	-	Mirror signal or BCA signal input.

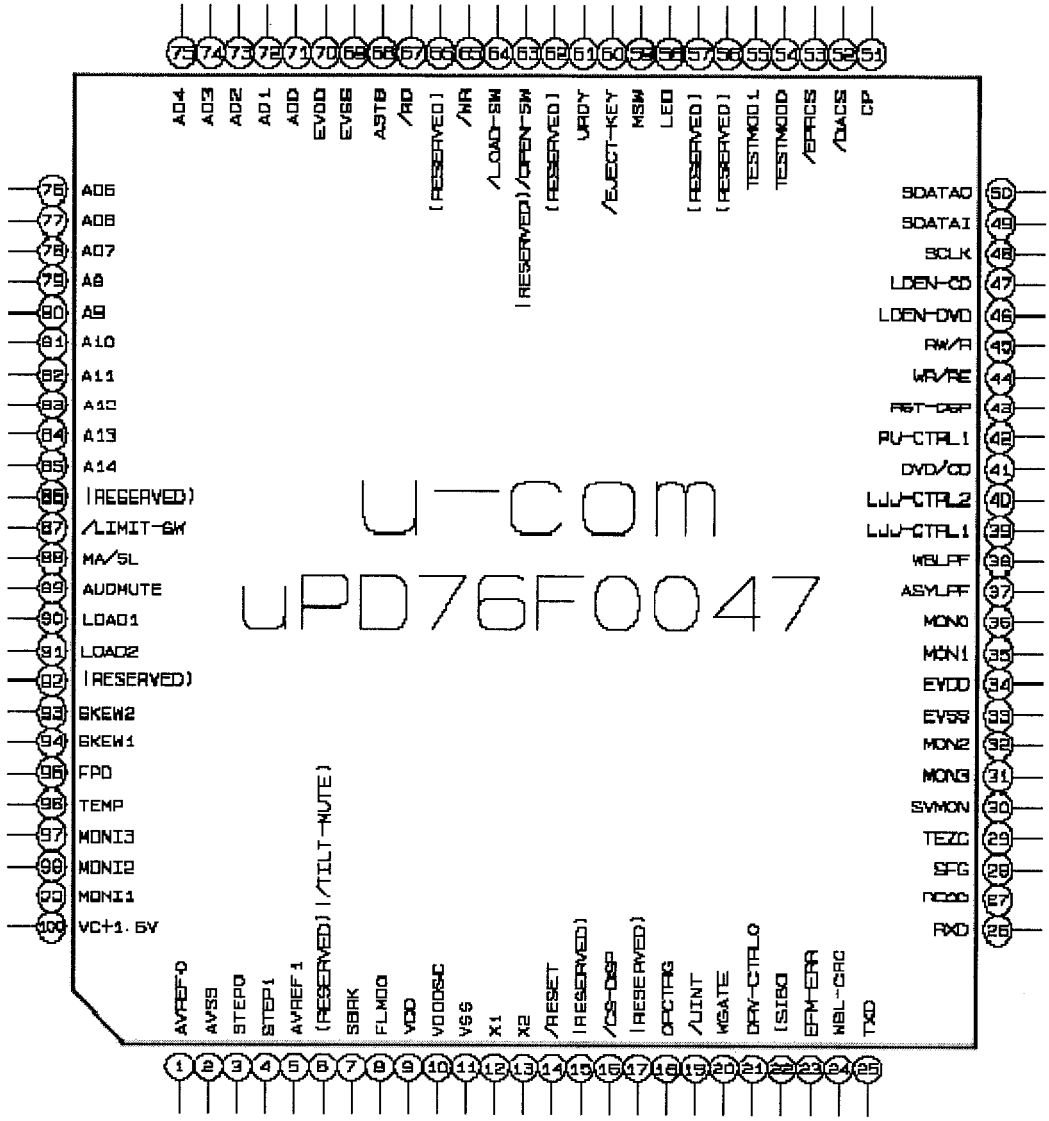
Pin No.	Pin Name		Type		Description
121	MIRRBCA	3V	O	Pull-up	RF AMP PC3320 RF equalizer automatic follow-up clock output.
122	EQCK1	3V	O	Pull-up	RF AMP PC3320 RF equalizer fixed clock output.
123	SCFCK	3V	O	P	RF AMP PC3320 RF equalizer automatic follow-up clock output.
124	WLDON	3V	O	L	Laser, Driver write laser control signal.
125	ROPC2	3V	O	L	Running OPC,sample hold signal.
126	DVDD33	-	-	-	Digital power.[3.3V]
127	DGND	-	-	-	Digital GND
128	ROPC1	3V	O	L	Running OPC,sample hold signal.
129	ROPC1	3V	O	L	APC write, sample hold signal.
130	SHAPCRE	3V	O	H	APC read/erase, sample hold signal.
131	SHSV	3V	O	H	Servo, sample hold signal.
132	SHWB	3V	O	H	Wobble, sample hold signal.
133	WBLLPP	3V	I	-	CD: 2 direct Wobble signal input, DVD: RLPP signal input.
134	TEC	3V	I	-	Test port. It must be connected to DGND.
135	TEC	3V	I	-	Tracking, zero, cross signal input.
136	DGND	-	-	-	Digital GND
137	LE	Analog	I	-	Lens error signal input [A/D convertor].
138	FE	Analog	I	-	Focus error signal input [A/D convertor].
139	TE	Analog	I	-	Tracking error signal input [A/D convertor].
140	SWRF2	Analog	I	-	WRF sample hold signal input [A/D convertor].
141	SWRF1	Analog	i	-	WRF sample hold signal input [A/D convertor].
142	REFIN	Analog	I	-	Reference voltage input [A/D convertor].
143	AGND	-	-	-	Analog GND[Servo A/D, D/A block]
144	AVDD	-	-	-	Analog power 2.5V[Servo A/D, D/A block].
145	MDRV	Analog	O		Spindle drive output [D/A convertor output].
146	FDRV	Analog	O		Focus drive output [D/A convertor output].
147	TDRV	Analog	O		Trackng drive output [D/A convertor output].
148	SDRV	Analog	O		Sled drive output [D/A convertor output].
149	REFOUT	Analog	O	1/2AVDD	Reference voltage output.
150	DVDD25	-	-	-	Digital power[2.5V]
151	FG	5V_tolerant	I	-	FG signal input
152	SLED	5V_tolerant	O	-	Sled position sensor input.
153	INT	5V_tolerant	O	L	Interrupted request signal output to Local CPU

Pin No.	Pin Name		Type		Description
154	RDY	5V_tolerant	I	-	Access control signal output from Local CPU to SDRAM.
155	DVDD33	-	-	-	Digital power[3.3V]
156	A14	5V_tolerant	I	-	Local CPU Adress bus.
157	A13	5V_tolerant	I	-	Local CPU Adress bus.
158	A12	5V_tolerant	I	-	Local CPU Adress bus.
159	A11	5V_tolerant	I	-	Local CPU Adress bus.
160	A10	5V_tolerant	I	-	Local CPU Adress bus.
161	A9	5V_tolerant	I	-	Local CPU Adress bus.
162	A8	5V_tolerant	I	-	Local CPU Adress bus.
163	DGND	-	-	-	Digital GND
164	AD7	5V_tolerant	I/O	-	Local CPU Adress/data mux bus.
165	AD6	5V_tolerant	I/O	-	Local CPU Adress/data mux bus.
166	AD5	5V_tolerant	I/O	-	Local CPU Adress/data mux bus.
167	AD4	5V_tolerant	I/O	-	Local CPU Adress/data mux bus.
168	AD3	5V_tolerant	I/O	-	Local CPU Adress/data mux bus.
169	AD2	5V_tolerant	I/O	-	Local CPU Adress/data mux bus.
170	DVDD33	-	-	-	Digital power[3.3V]
171	AD1	5V_tolerant	I/O	-	Local CPU Adress/data mux bus.
172	AD0	5V_tolerant	I/O	-	Local CPU Adress/data mux bus.
173	RD	5V_tolerant	I	-	Read strobe signal input.
174	WR	5V_tolerant	I	-	Write strobe signal input.
175	ASTB	5V_tolerant	I	-	Address strobe input.
176	$\overline{CS}$	5V_tolerant	I	-	Chip selector input from Local CPU.
177	$\overline{SYSRST}$	5V_tolerant	I	-	Reset input.
178	DGND	-	-	-	Digital GND.
179	DVDD25	-	-	-	Digital power[2.5V]
180	OPCTRG	3V	I/O	-	Wobble FM demodulation data output. DVD mode: OPCTRG signal output.
181	HFON	3V	O	H	Laser, Driver high-frequency control signal.
182	WRCK	-	-	L	Write Clock.
183	DVDD33	-	-	-	Digital power[3.3V]
184	WRPULSE	3V	O	L	Write pulse [write laser/driver control signal]
185	OFPULSE	3V	O	H	Write pulse [write laser/driver control signal]
186	DGND	-	-	-	Digital GND.

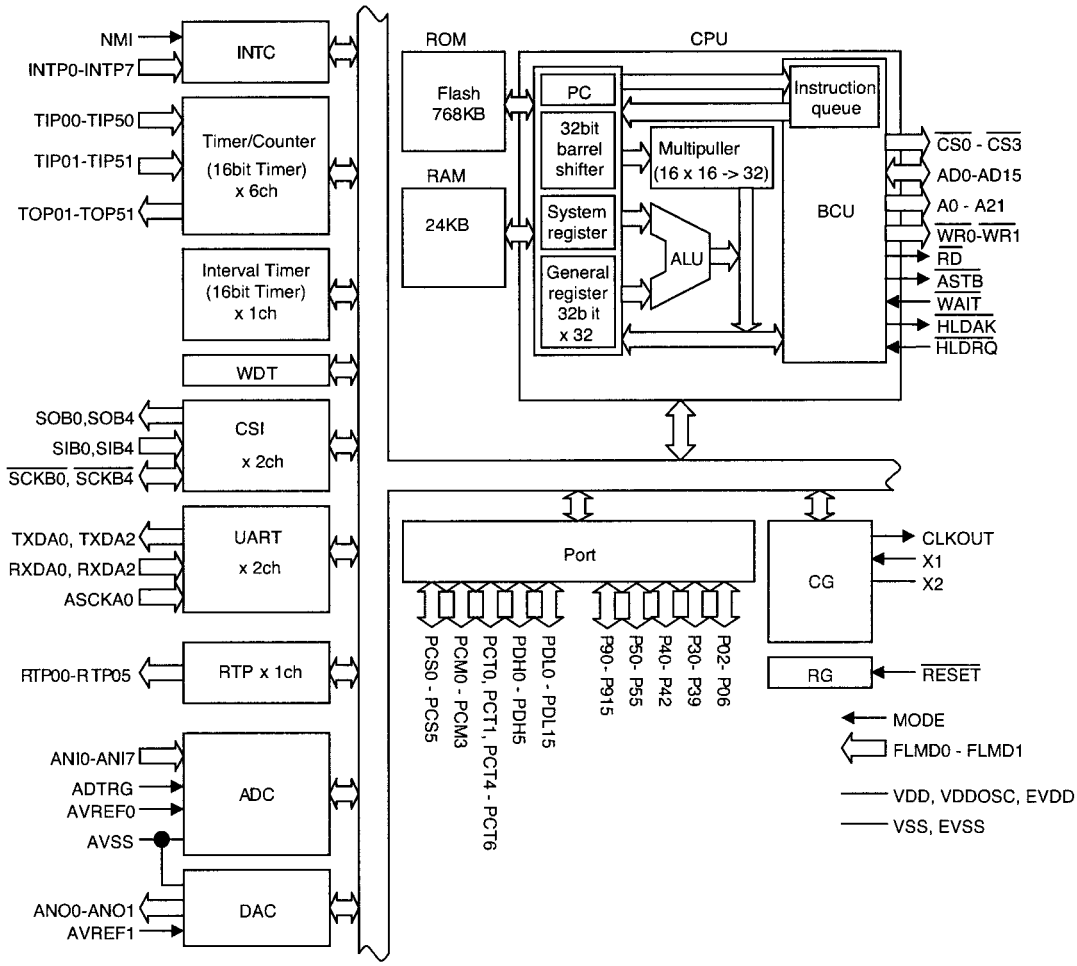
Pin No.	Pin Name		Type		Description
187	DVDD33	-	-	-	Digital power[3.3V]
188	EFPULSE	3V	O	L	OFF pluse output[write laser/driver control signal].
189	PKPULSE1	3V	O	L	Peak pluse output[write laser/driver control signal].
190	PKPULSE2	3V	O	L	Peak pluse output[write laser/driver control signal].
191	HDDREV	3V	I	-	Host interface data bus selector.[H: general, L: reverse]
192	AGND	-	-	-	Analog GND[WWAPLL]
193	AVDD	-	-	-	Analog power 2.5V [WWAPLL]
194	WWALPF1	Analog	-	-	WWAPLL condenser connecting port.
195	WWALPF2	Analog	-	-	WWAPLL condenser connecting port.
196	WRLPF	Analog	-	-	WST DLL condenser connecting port.
197	AGND	-	-	-	Analog GND[WST DLL block]
198	AVDD	-	-	-	Analog power 2.5V [WST DLL block]
199	AVDD	-	-	-	Analog power 2.5V [WDPLL A/D block]
200	WDADVRT	Analog	-	-	WDPLL block A/D convertor condenser connecting port.
201	AWBL	Analog	I	-	Analog wobble signal input port.
202	WDADVRB	Analog	-	-	WDPLL block A/D convertor condenser connecting port.
203	AGND	-	-	-	Analog GND[WDPLL A/D block]
204	AGND	-	-	-	Analog GND[PLL block]
205	AVDD	-	-	-	Analog power 2.5V [PLL block]
206	LPFCK	Analog	-	-	Test port. It must be connected to AGND.
207	AGND	-	-	-	Analog GND[Crystal block]
208	$\overline{\text{XTAL}}$	-	I/O	-	Crystal oscillator connecting port.
209	XTAL	-	I	-	Crystal oscillator connecting port.
210	DVDD25	-	-	-	Digital power[2.5V]
211	LRCK	3V	O	Pull-up	DOUT serial audio data.
212	SCKO	3V	O	Pull-up	Serial audio data synchronizing clock output port.
213	DVDD33	-	-	-	Digital power[3.3V]
214	DGND	-	-	-	Digital GND
215	DOUT	3V	O	Pull-up	Serial audio data output port.
216	EMPH	3V	O	Pull-up	Emphasis distingish signal.

4. IC302(uPD76f0047):MICOM

Pin Assignment



Block Diagram



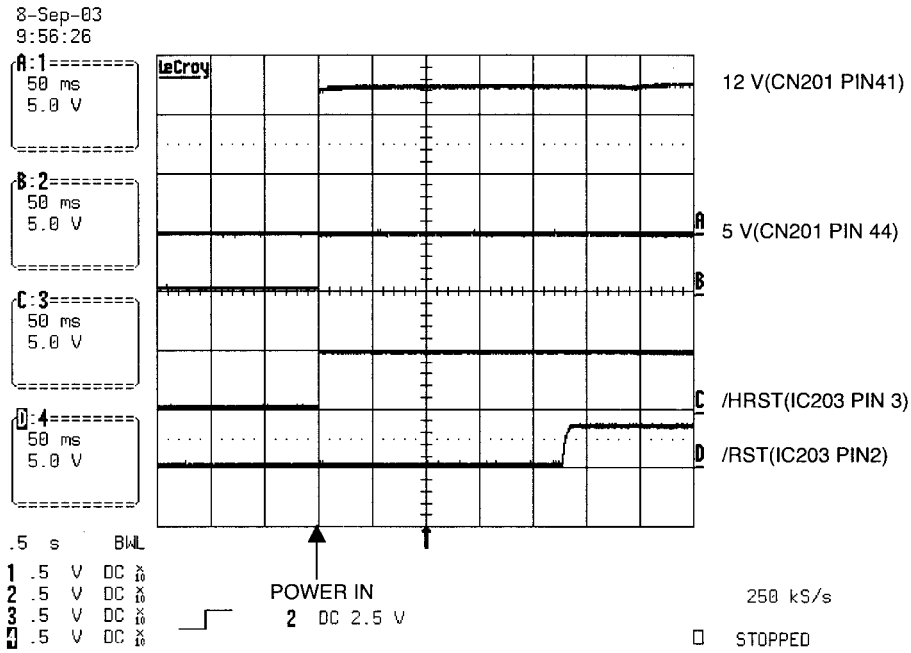
Pin description

Pin No.	Pin Name	Type	Des cription
1	AVREF0	I	A/D CONVERTER REFERENCE VOLTAGE INPUT
2	AVSS	-	A/D,D/A CONVERTER POTENTIAL
3	STEP0	O	STEPPTING MOTOR CONTROL SIGNAL
4	STEP1	O	STEPPTING MOTOR CONTROL SIGNAL
5	AVREF1	I	D/A CONVERTER REFERENCE VOLTAGE INPUT
6	TILT-MUTE	O	TILT DRIVE MUTE SIGNAL
7	SBRK	O	EXTERNAL MEMORY ADDRESS BUS
8	FLMD0	I	FLASH PROFLAMING MODE
9	VDD	-	I NTERNAL CONSTANT POWER
10	VDDOSC	-	CONSTANT POWER
11	VSS	-	INTERNAL GROUND POTENTIAL
12	X1	I	MAIN CLOCK
13	X2	-	MAIN CLOCK
14	/RESET	I	SYSTEM RESET
15	(RESERVED)	-	-
16	/CS-DSP	O	CHIP SELECTOR OUPUT
17	(RESERVED)	-	-
18	OPCTRG	I/O	WOBBLE FM DE M ODUL ATI ON DATA
19	/UINT	I	INTERRUPTED REQUEST SIGNAL INPUT
20	WGATE	I	DRIVER WRITER LASER CONTROL SIGNAL
21	DRV-CTRL0	-	-
22	SIB0	I	SERIAL CLOCK
23	EFM-ERR	-	-
24	WBL-CRC	-	-
25	TXD	O	SERIAL CLOCK
26	RXD	I	SERIAL CLOCK
27	RECD	I	NO RECODRDING AREA DETECTION
28	SFG	I	FG SIGNAL INPUT
29	TEZC	I	TRACK ZERO CROSS SIGNAL INPUT
30	SVMON	I	SERVO BLOCK MONITOR SIGNAL
31	MON3	I	M ONI TOR TEST SINGNAL
32	MON2	I	M ONI TOR TEST SINGNAL
33	EVSS	-	EXTERNAL CONSTANT POWER
34	EVDD	-	EXTERNAL CONSTANT POWER
35	MON1	I	MONITOR TEST SINGNAL
36	MON0	I	MONITOR TEST SINGNAL
37	ASYLPF	-	-
38	WBLPF	-	-
39	LJJ-CTRL1	-	-
40	LJJ-CTRL2	-	-
41	DV D/CD	-	-
42	PU-CTRL1	O	PD IC GAIN CONTROL SIGNAL
43	RST-DSP	O	RESET OUT
44	WR/RE	O	PD IC GAIN COTTROL SI NAL(WRITE/READ)
45	RW/R	-	-
46	LDEN-DVD	O	PICK-UP LD ENABLE SIGNAL (DV D)
47	LDEN-CD	O	PIC K-UP LD ENABLE SIGNAL (C D)
48	SCLK	O	REGISTER SETTING CLOCK
49	SDATAI	I	REGISTER SETTING DATA INPUT
50	SDATAO	O	REGISTER SETTING DATA OUTPUT

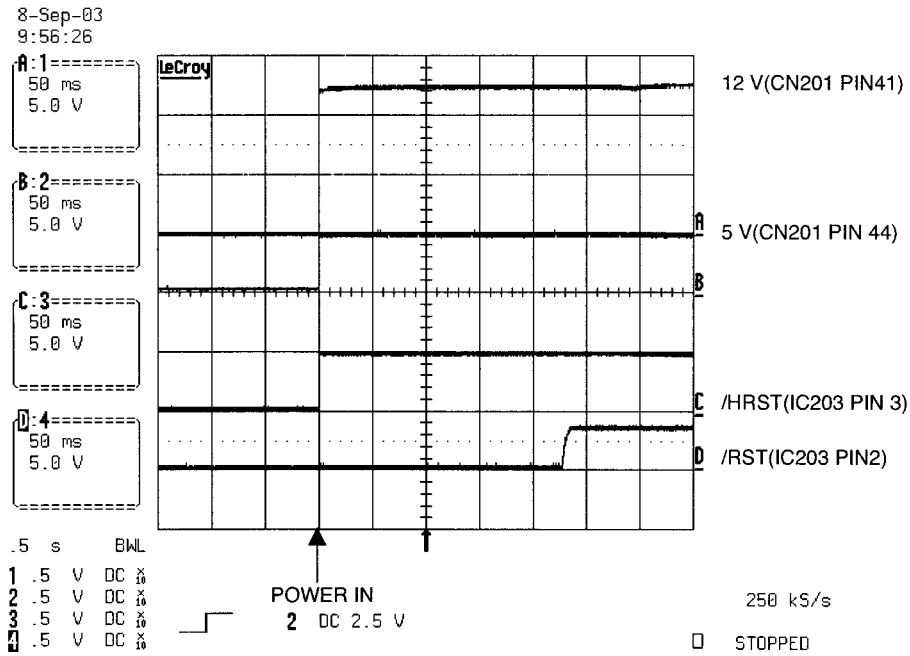
Pin No.	Pin Name	Type	Des cription
51	CP	O	REGISTER ADDRESS OUPUT
52	/DACS	O	CHIP SELECTOR
53	/BPRCS	O	EEPROM COMM UNICATON LINE
54	TEST MOD0	-	-
55	TEST MOD1	-	-
56	(RESERVED)	-	-
57	(RESERVED)	-	-
58	LED	O	LED ENABLE LINE
59	MSW	O	LED ENABLE LINE
60	/EJECT-KEY	O	TRAY OPE N LINE
61	URDY	O	ACCESS CONTROL SIGNAL INPUT FRON CPU TO SDRAM
62	(RESERVED)	-	-
63	/OPEN-SW	I	OPEN S/W INPUT
64	/LOAD-SW	I	LOAD S/W INPUT
65	/WR	O	WRITE STROBE SIGNAL OUTPUT
66	(RESERVED)	-	-
67	/RD	O	READ STROBE SIGNAL OUPUT
68	ASTB	O	ADDRESS STROBE OUPUT
69	EVSS	-	EX TERNAL CONSTANT POWER
70	EVDD	-	EX TERNAL CONSTANT POWER
71	AD0	I/O	PORT DL 16BIT INPUT/OUTPUT
72	AD1	I/O	PORT DL 16BIT INPUT/OUTPUT
73	AD2	I/O	PORT DL 16BIT INPUT/OUTPUT
74	AD3	I/O	PORT DL 16BIT INPUT/OUTPUT
75	AD4	I/O	PORT DL 16BIT INPUT/OUTPUT
76	AD5	I/O	PORT DL 16BIT INPUT/OUTPUT
77	AD6	I/O	PORT DL 16BIT INPUT/OUTPUT
78	AD7	I/O	PORT DL 16BIT INPUT/OUTPUT
79	A8	I/O	PORT DL 16BIT INPUT/OUTPUT
80	A9	I/O	PORT DL 16BIT INPUT/OUTPUT
81	A10	I/O	PORT DL 16BIT INPUT/OUTPUT
82	A11	I/O	PORT DL 16BIT INPUT/OUTPUT
83	A12	I/O	PORT DL 16BIT INPUT/OUTPUT
84	A13	I/O	PORT DL 16BIT INPUT/OUTPUT
85	A14	I/O	PORT DL 16BIT INPUT/OUTPUT
86	(RESERVED)	I/O	PORT DL 16BIT INPUT/OUTPUT
87	/LIMIT-SW	I	TRAY LIMIT S/W INPUT
88	MA/SL	I	MASTER/SLAVE MODE SELECTOR
89	AUDMUTE	-	-
90	LOAD1	O	STANDBY/BRAKE CONTROL SIGNAL
91	LOAD2	O	STANDBY/BRAKE CONTROL SIGNAL
92	(RESERVED)	-	-
93	SKEW2	-	-
94	SKEW1	-	-
95	FPD	I	TEMPERATURE MONITOR CURRENT INPUT
96	TEMP	I	MONITOR TEST SINGNAL
97	MONI3	I	FOCUS ERROR INPUT
98	MONI2	I	LASER MONITOR CURRENT INPUT
99	MONI1	I	PDIC REFERNEC VOLTAGE
100	VC+1.5V	I	VCC 1.5V INPUT

WAVEFORMS

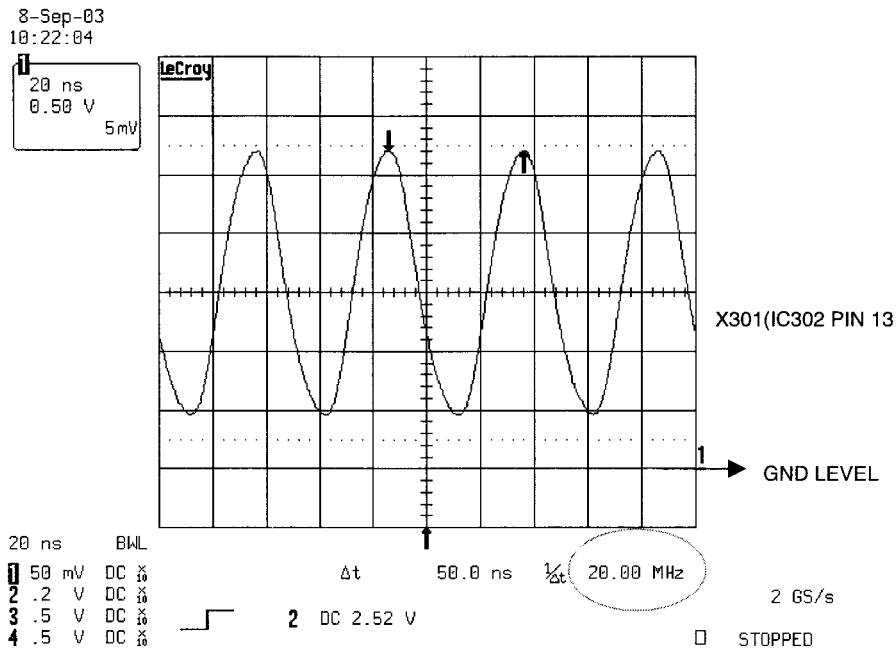
1. POWER & RESET Signal



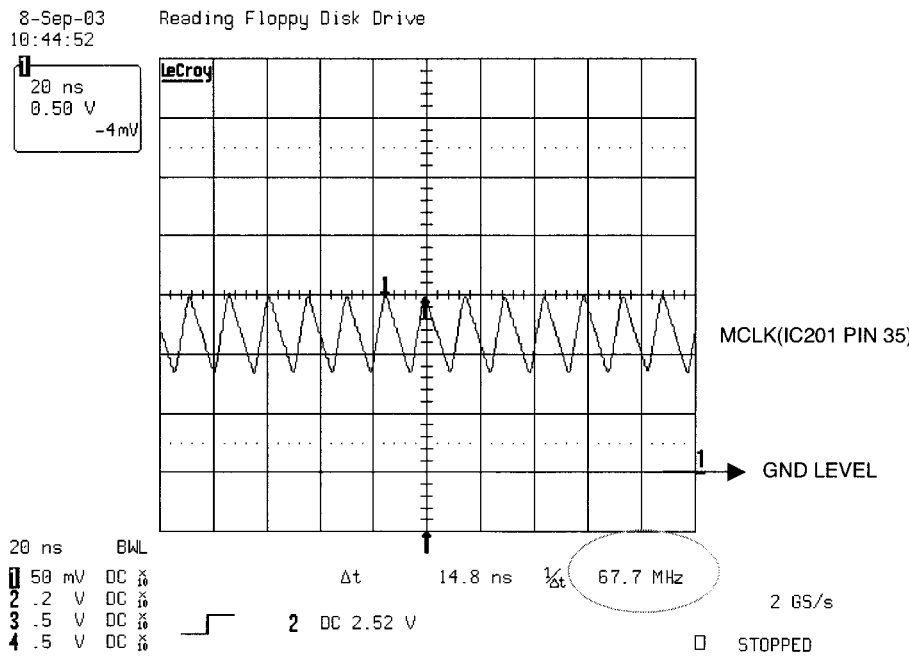
2. Main Clock1 for IC202 (16.9MHz)



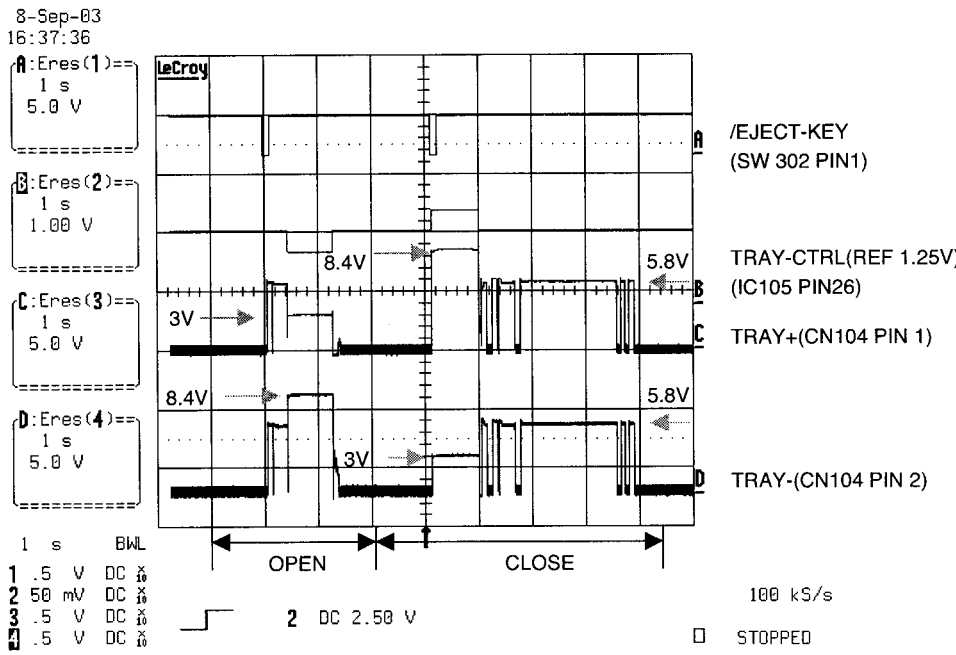
3. Main Clock2 for IC302 (20MHz)



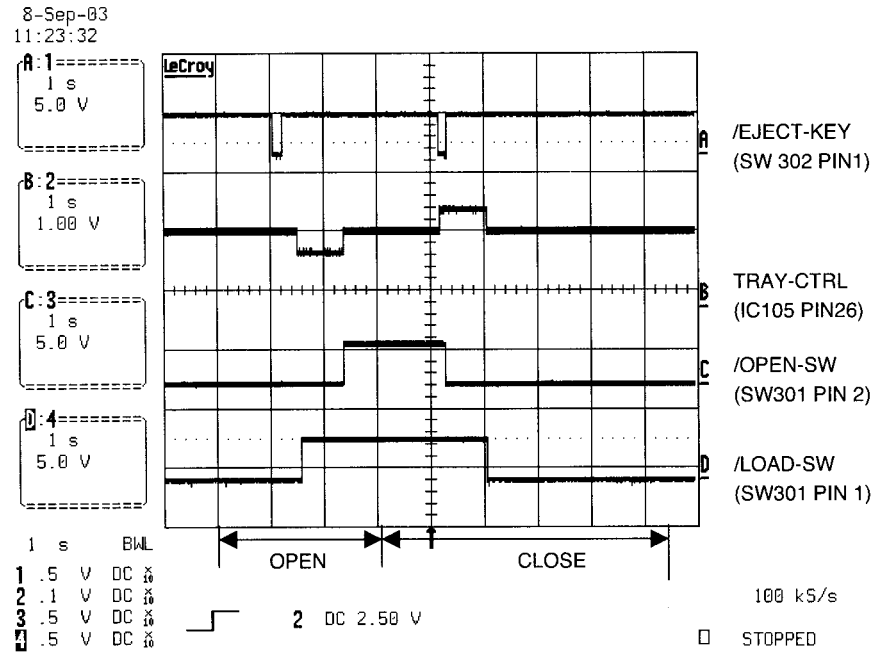
4. SDRAM Clock



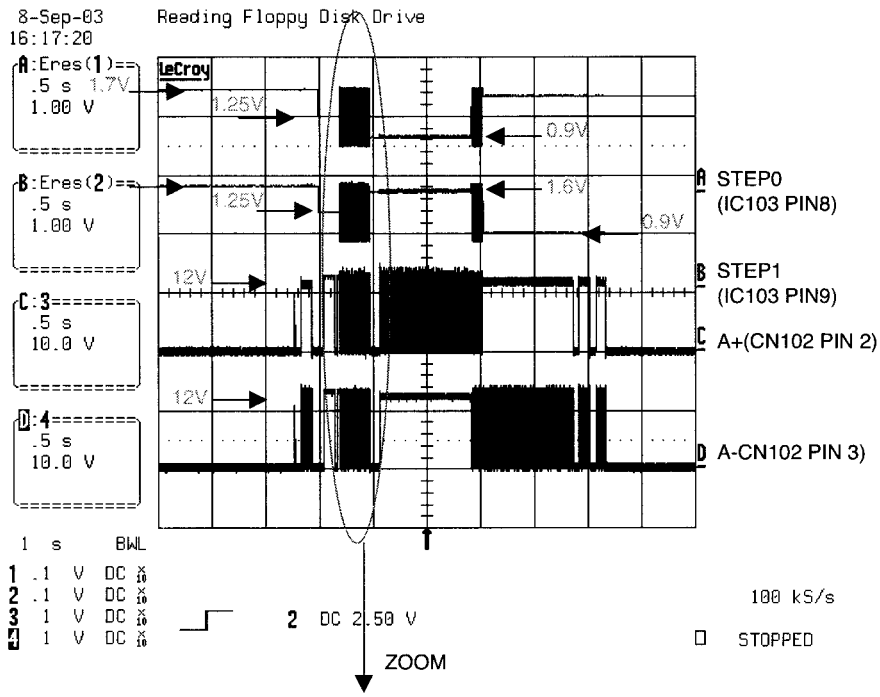
5. TRAY OPEN/CLOSE SIGNAL 1



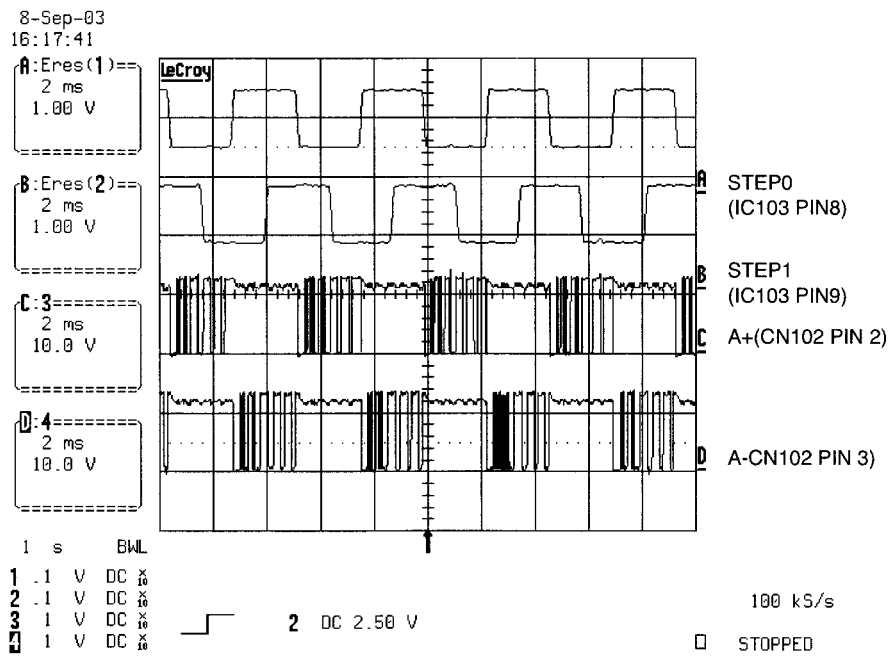
6. TRAY OPEN/CLOSE SIGNAL 2



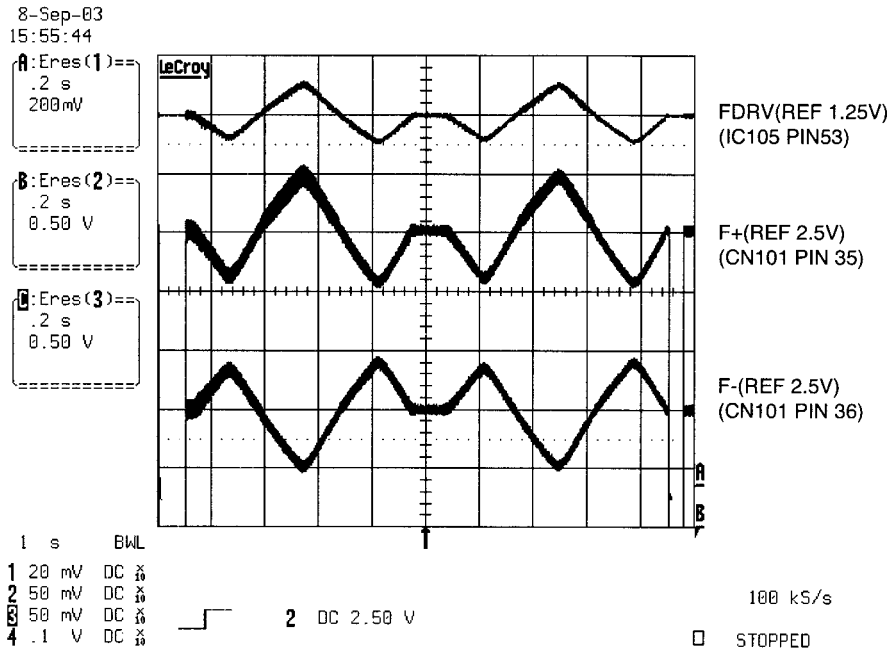
7. SLED MOVE SIGNAL 1



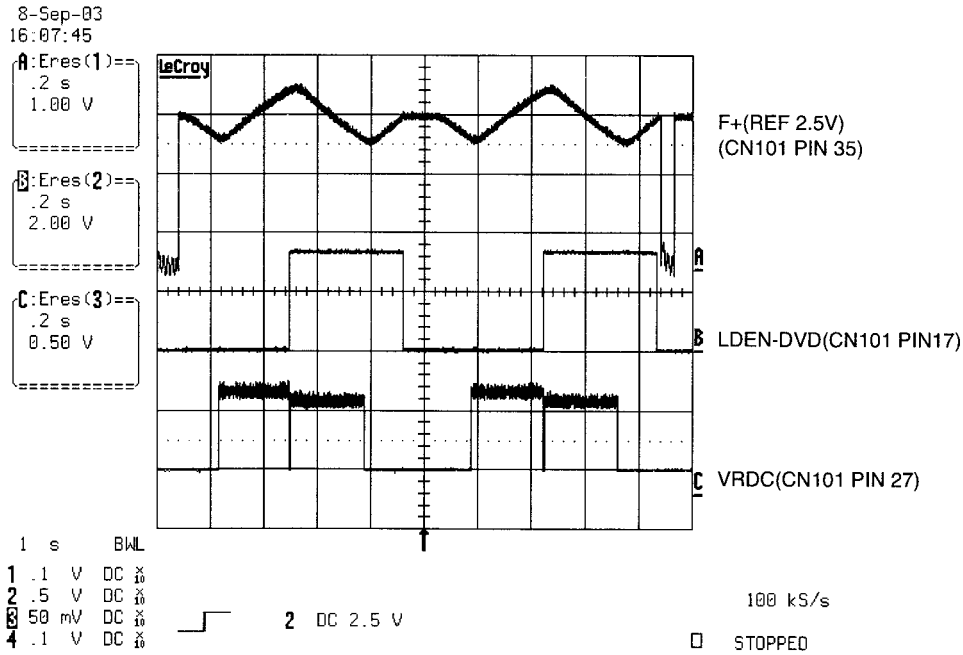
8. SLED MOVE SIGNAL 2



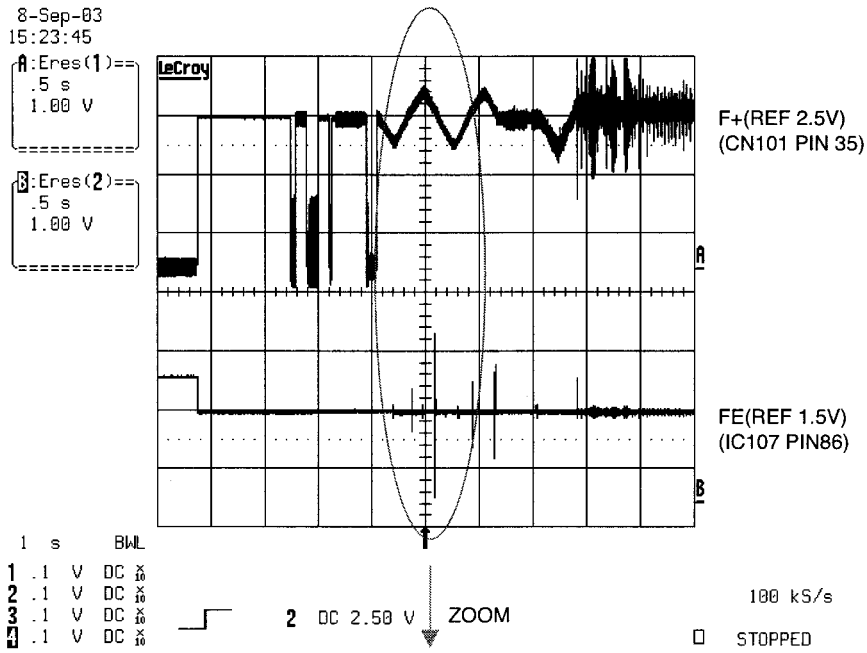
9. FOCUS SEARCH SIGNAL



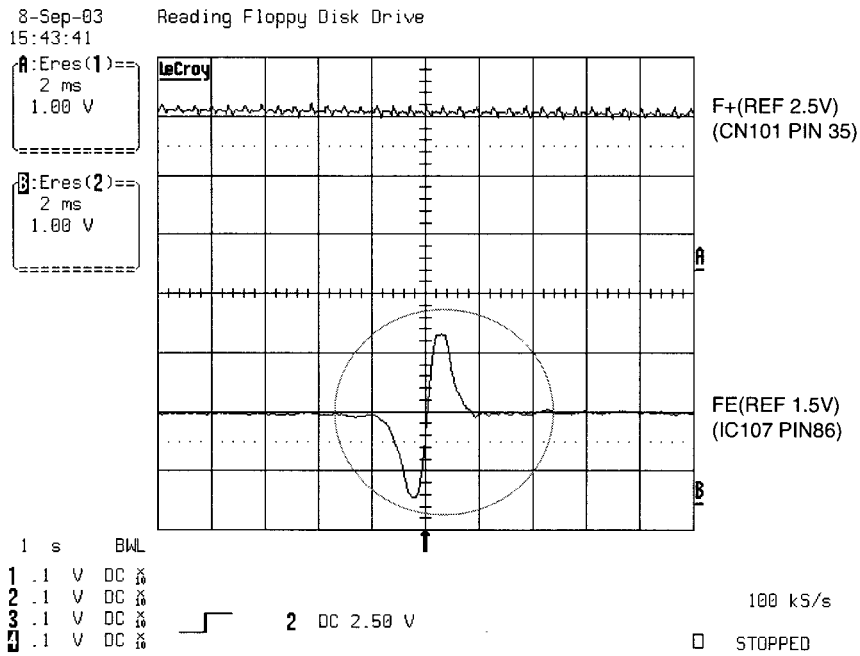
10. LASER TURN ON SIGNAL



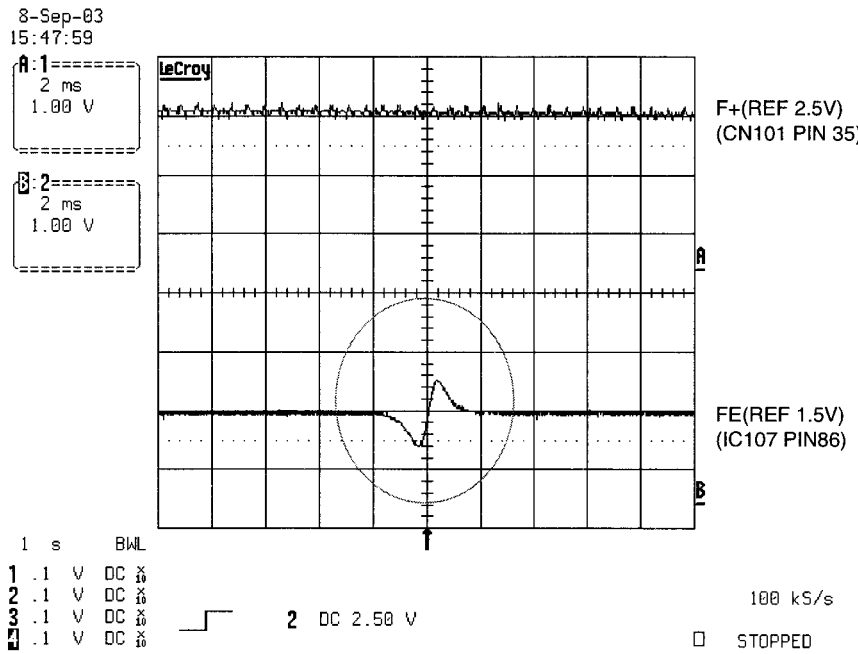
11. DISC TYPE JUDGEMENT WAVEFORM (CD SERIES)



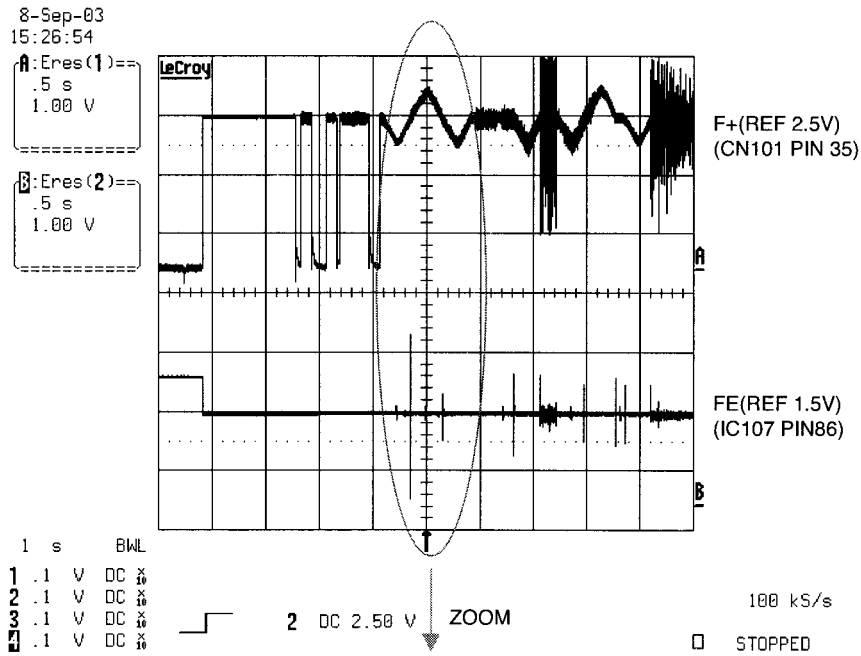
12. DISC TYPE JUDGEMENT WAVEFORM (CD&CD-R)



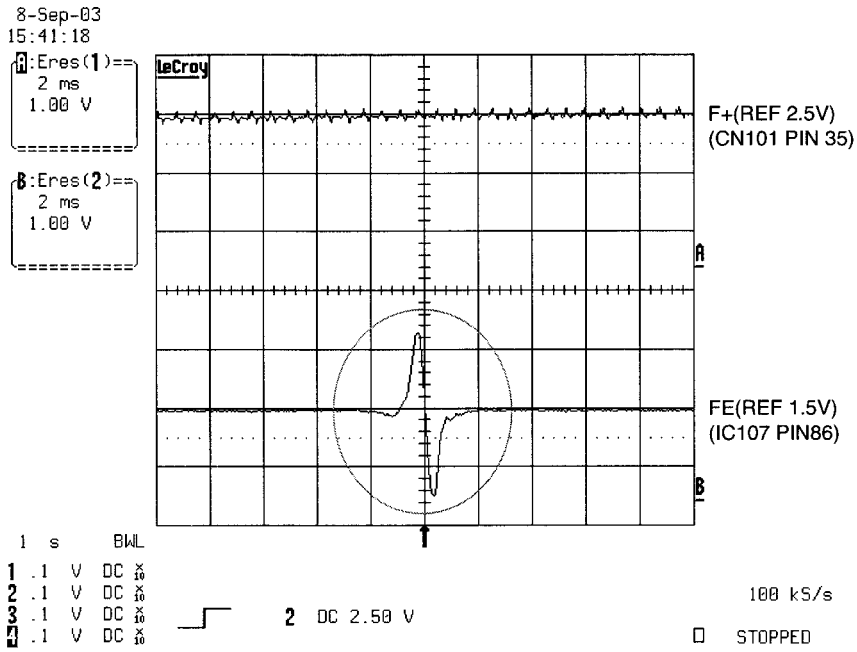
13. DISC TYPE JUDGEMENT WAVEFORM (CD-RW)



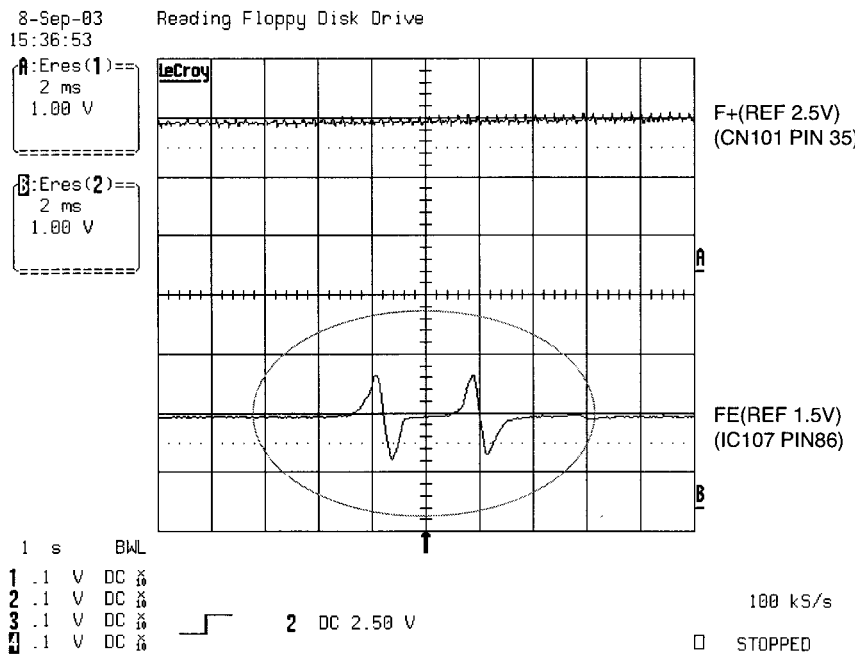
14. DISC TYPE JUDGEMENT WAVEFORM (DVD SERIES)



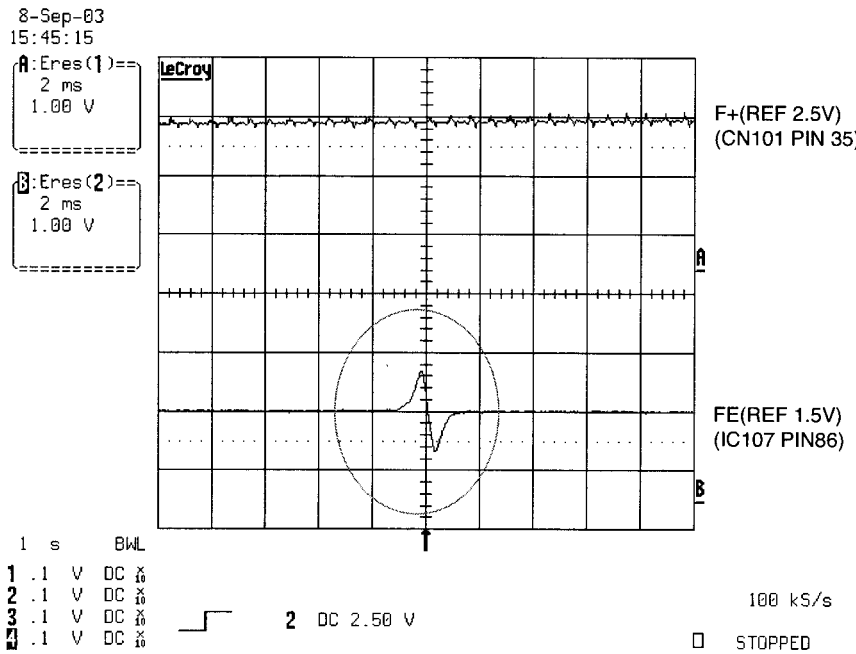
15. DISC TYPE JUDGEMENT WAVEFORM (DVD_SINGLE&R)



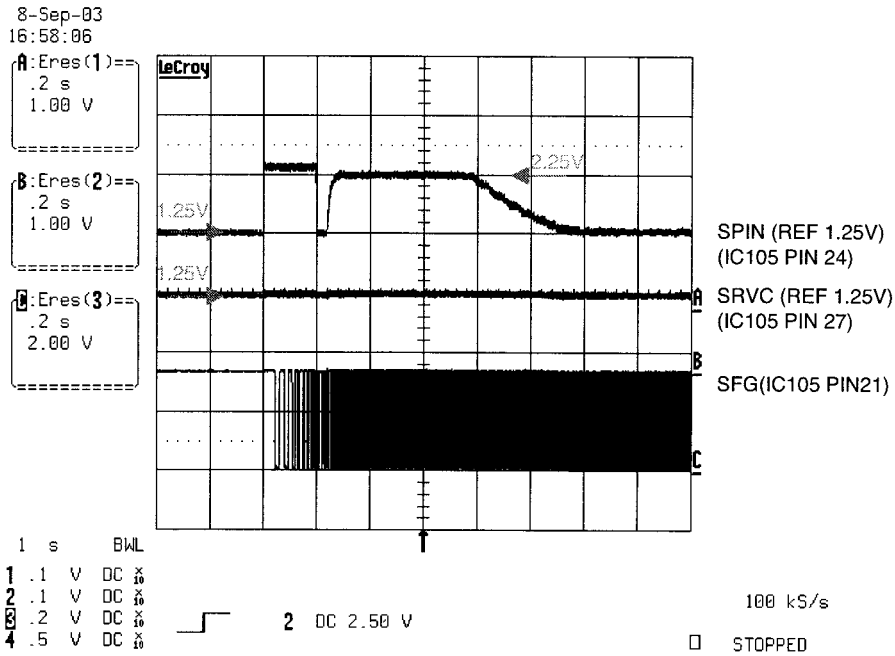
16. DISC TYPE JUDGEMENT WAVEFORM (DVD _DUAL)



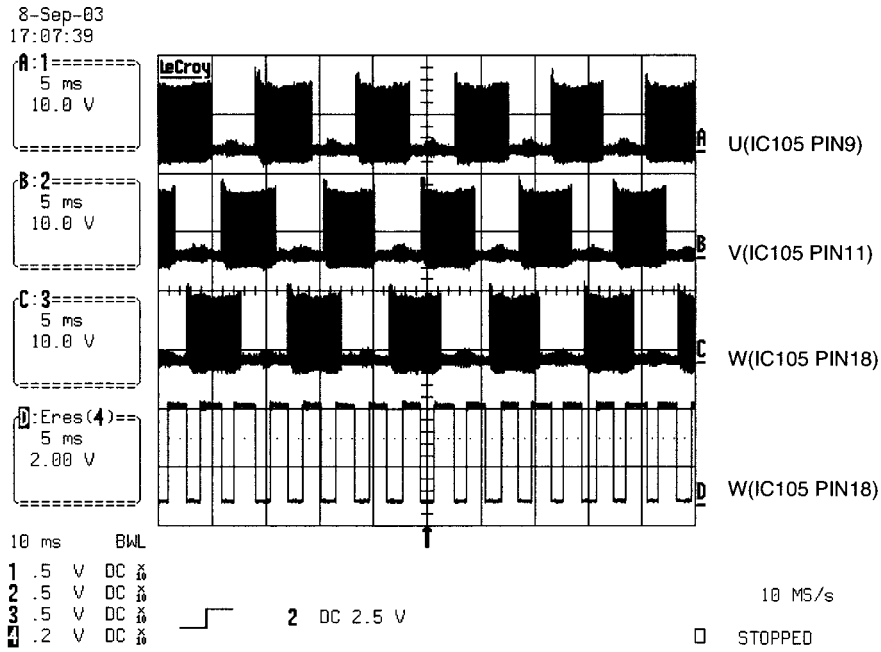
17. DISC TYPE JUDGEMENT WAVEFORM (DVDRW)



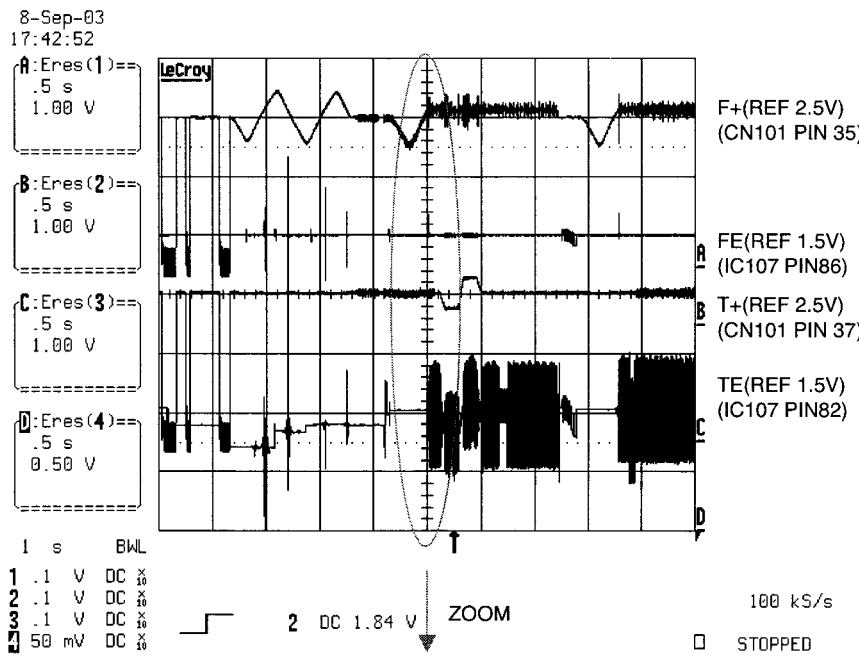
18. SPINDLE WAVEFORM1



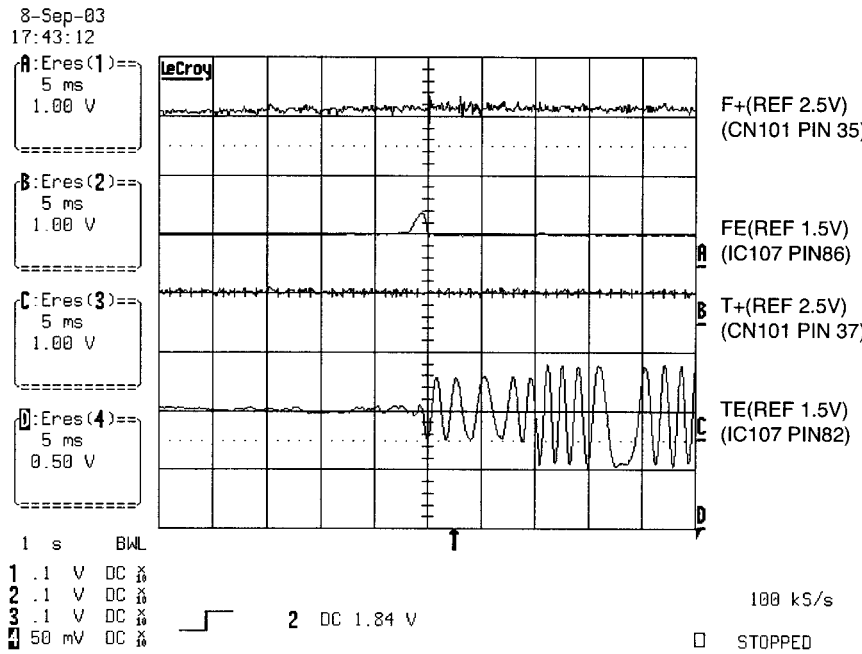
19. SPINDLE WAVEFORM2



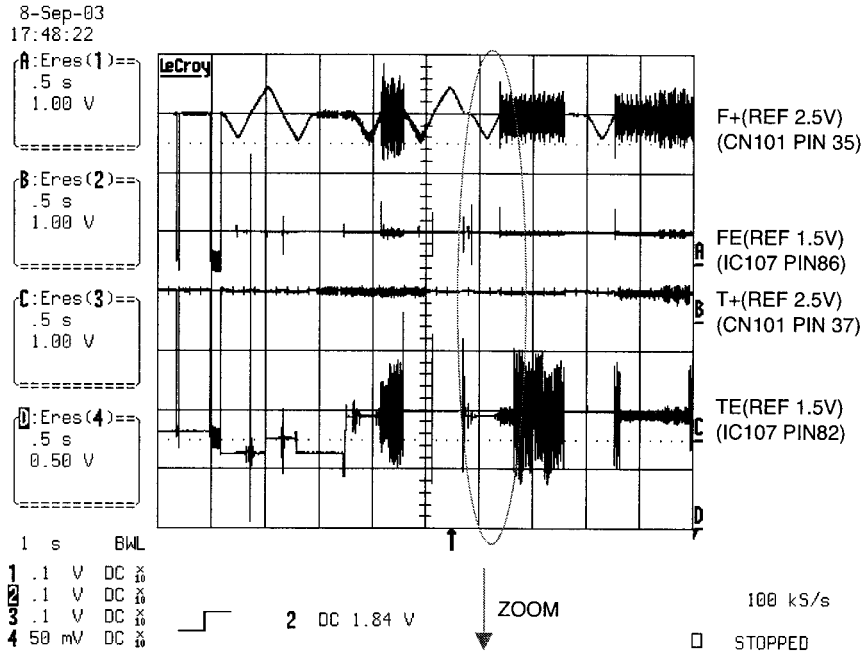
20. FOCUS ON SIGNAL(CD)



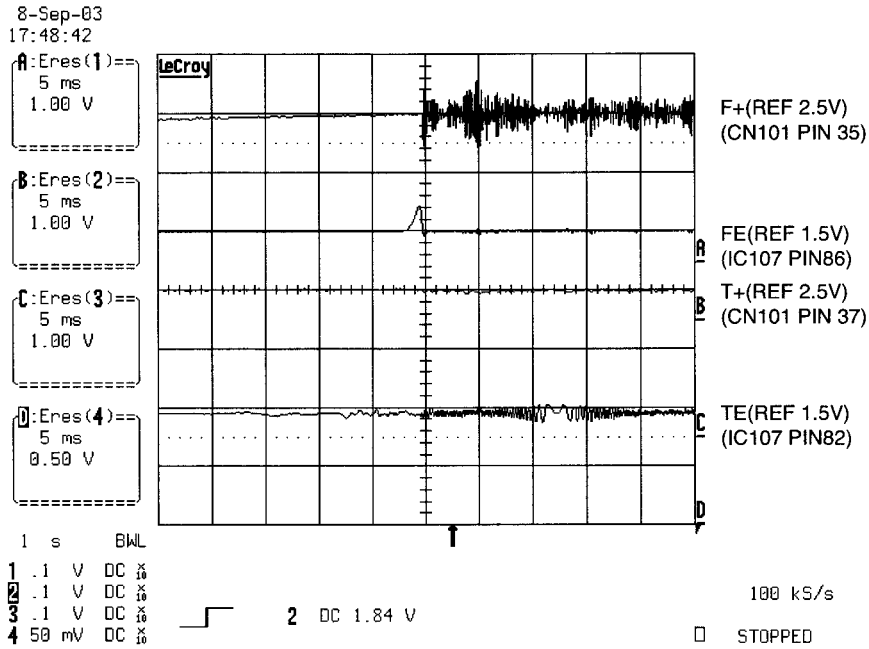
21. FOCUS ON SIGNAL(CD)



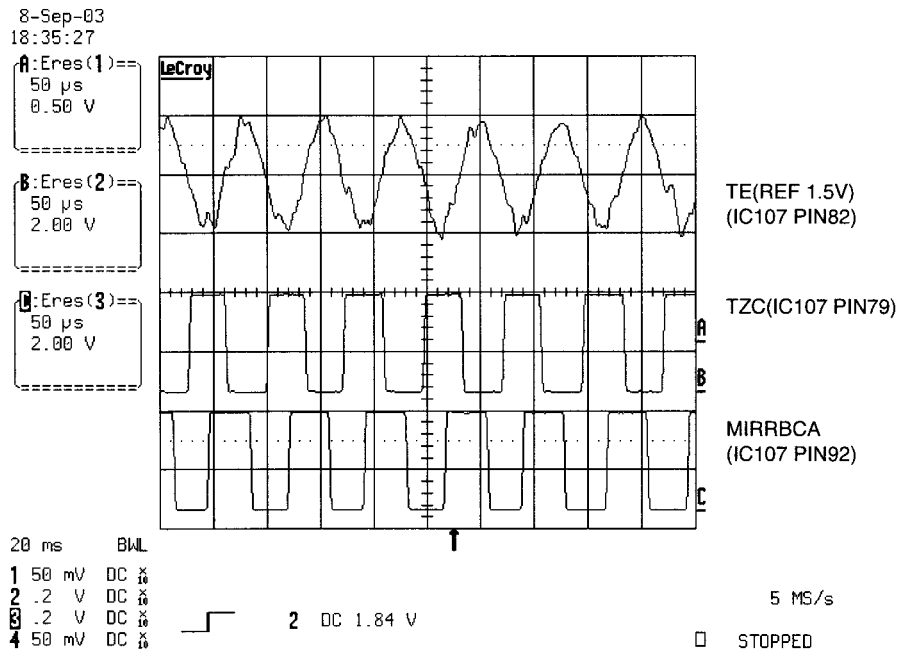
22. FOCUS ON SIGNAL(DVD)



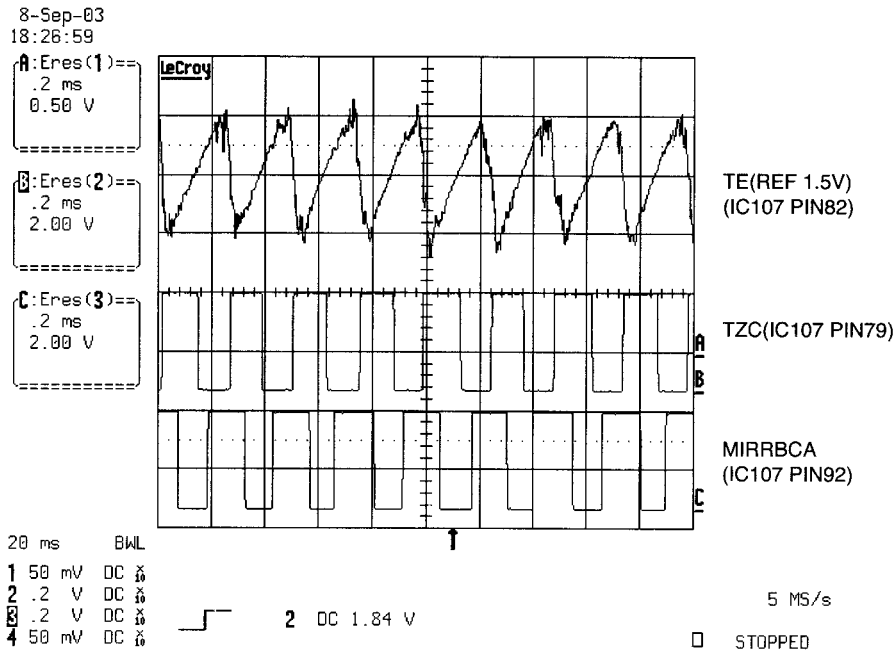
23. FOCUS ON SIGNAL (DVD)



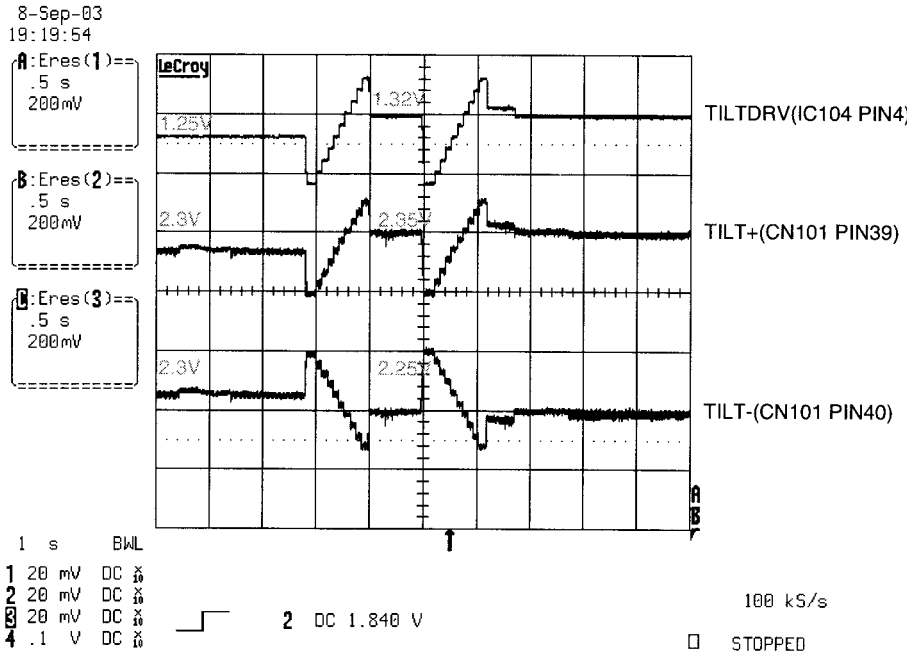
24. TRACK OFF SIGNAL(CD)



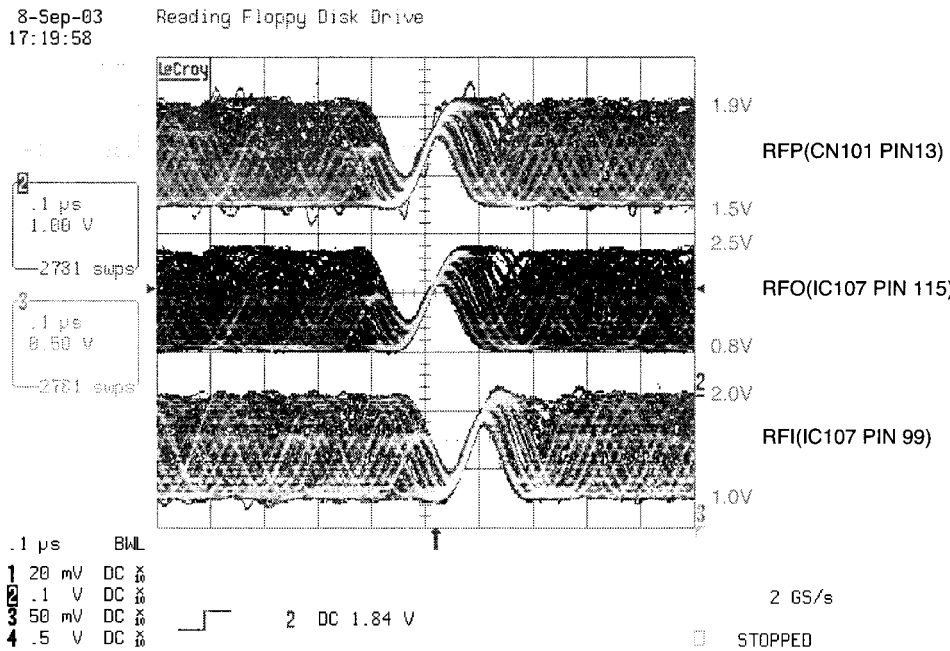
25. TRACK OFF SIGNAL(DVD)



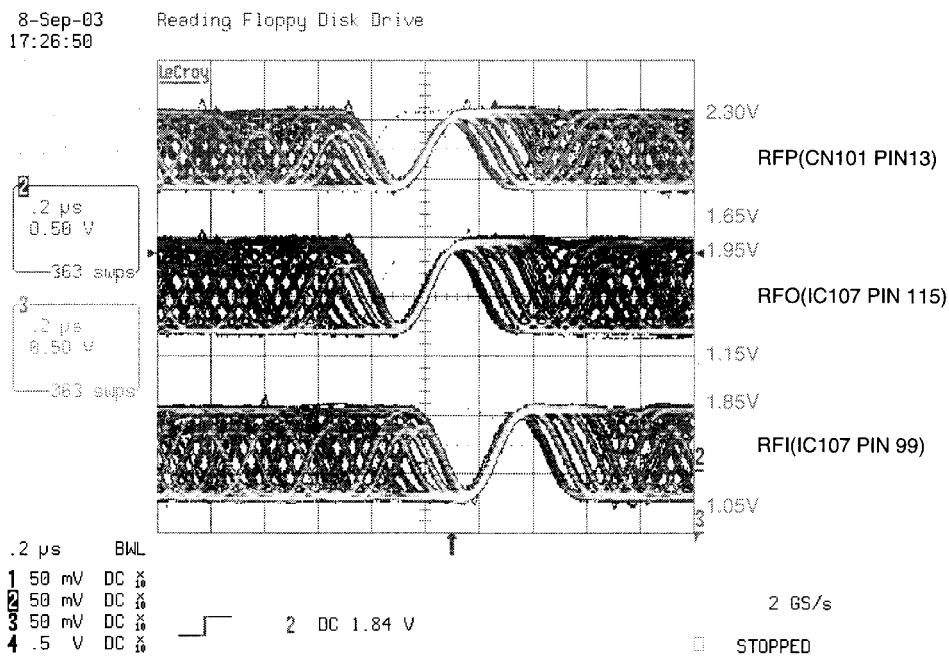
26. Tilt Driver signal(Disc reading)



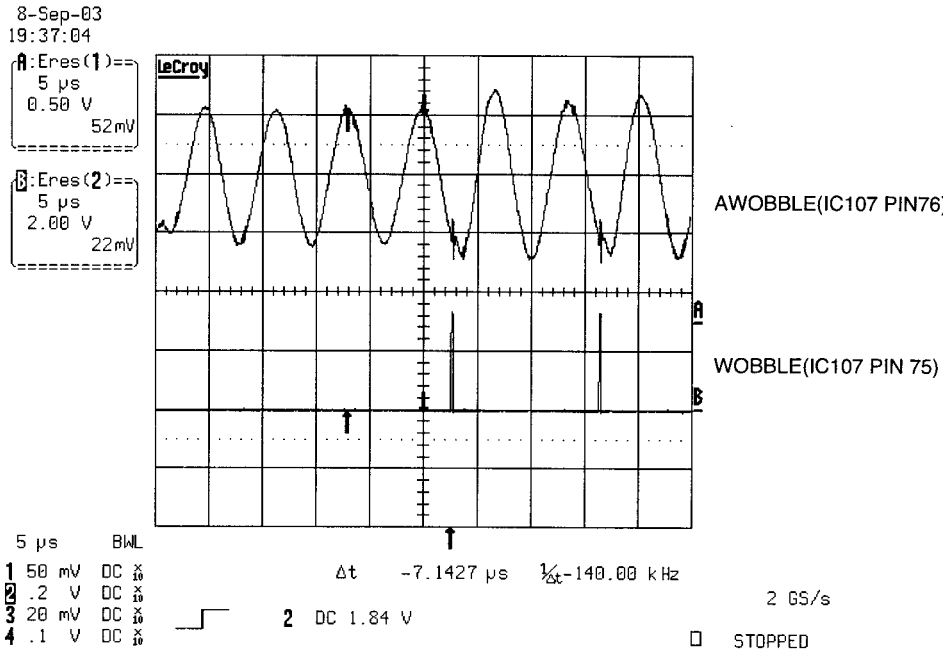
27. RF WAVEFORM(DVD)



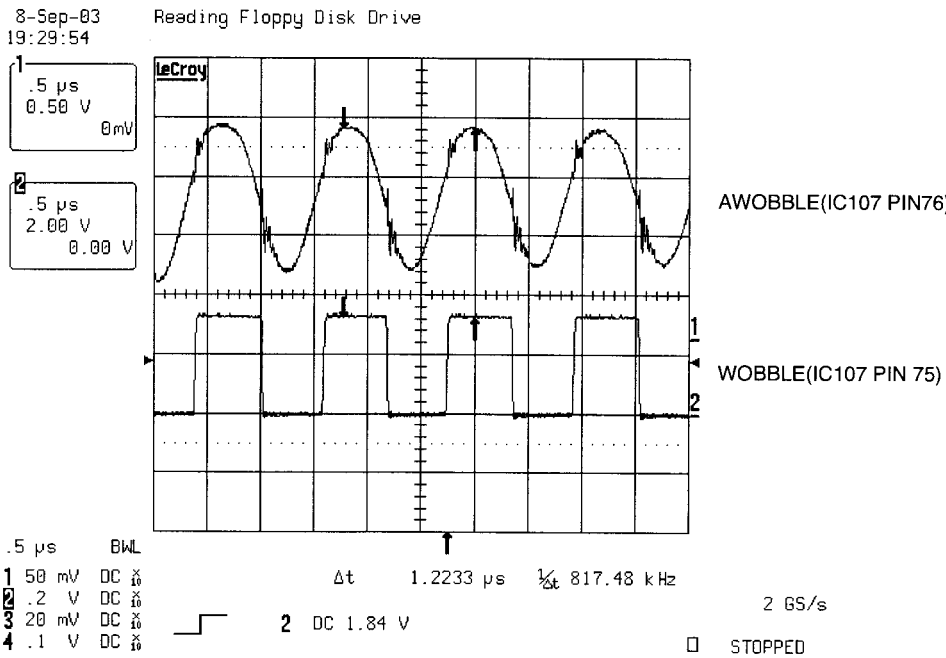
28. RF WAVEFORM(CD)



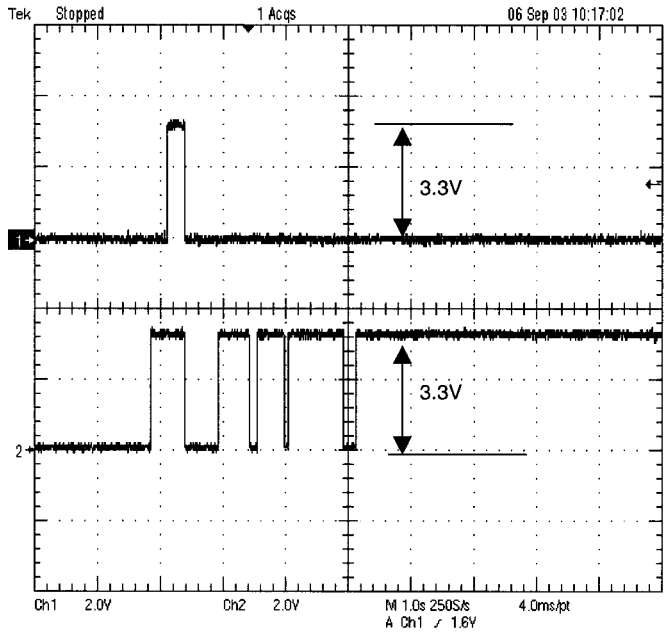
29. WOBBLE(DVD-R/RW)_READING



30. WOBBLE(DVD+R/RW)_READING&WRITING =>X1 SPEED



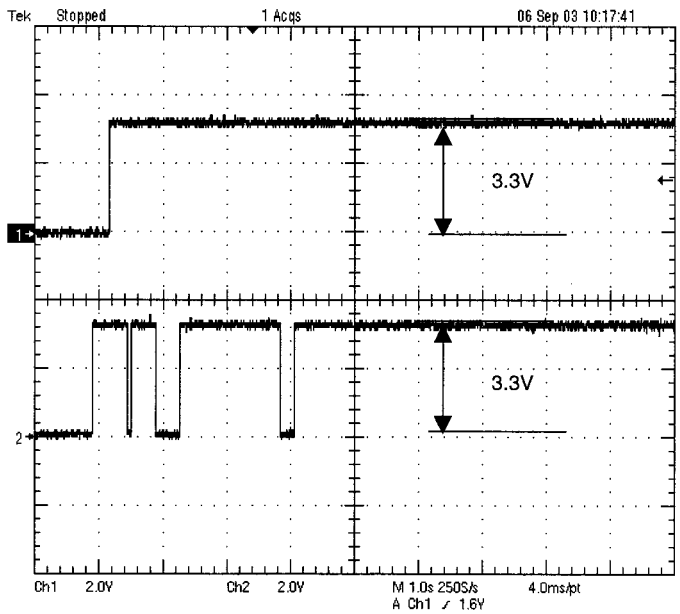
31. LD Enable(DVD)



LDENDVD(CN101 PIN 17)

LDENCD(CN101 PIN 33)

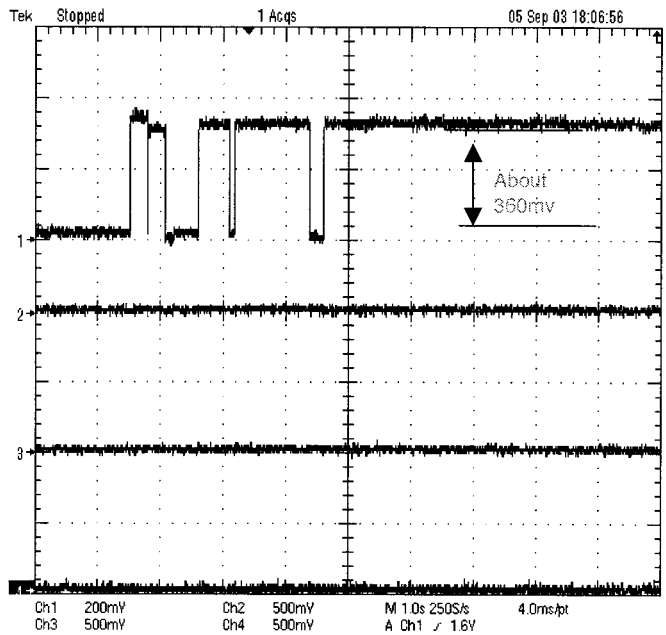
32. LD Enable(CD)



LDENDVD(CN101 PIN 17)

LDENCD(CN101 PIN 33)

33. Laser Power(reading)_DVD+RW



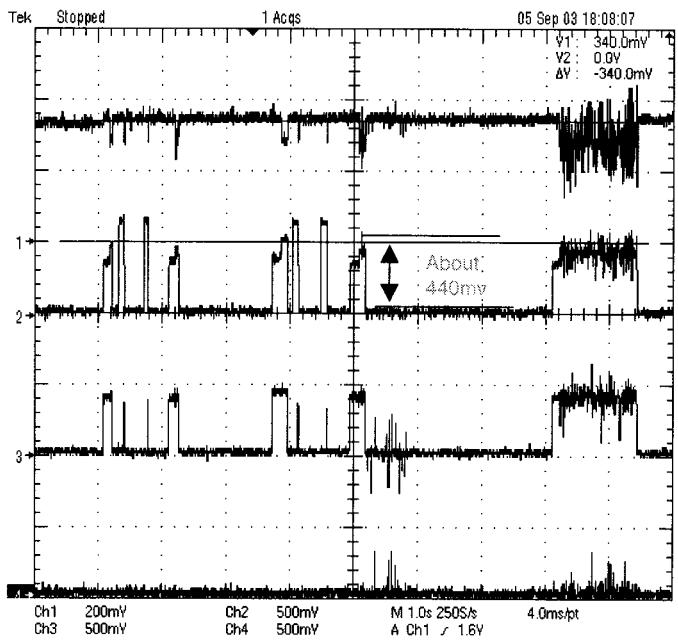
VRDC(IC107 PIN 31)

VWDC1(IC107 PIN 34)

VWDC2(IC107 PIN 36)

OPECTRG(IC107 PIN 55)

34. Laser Power(Erase)_DVD+RW



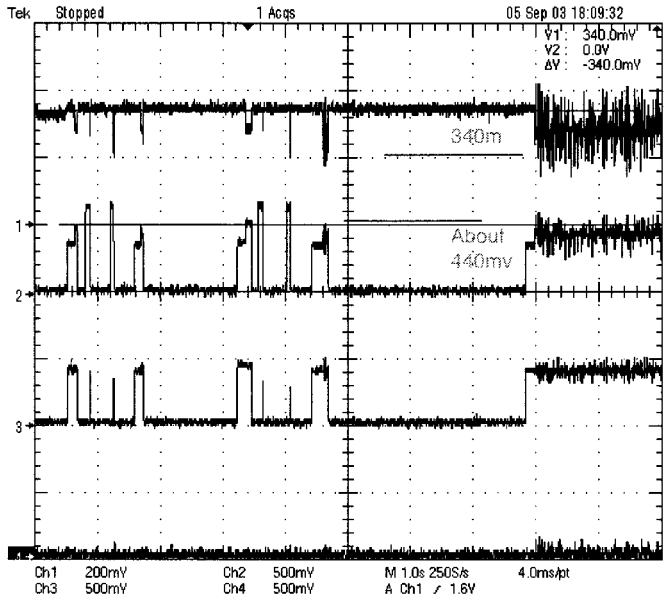
VRDC(IC107 PIN 31)

VWDC1(IC107 PIN 34)

VWDC2(IC107 PIN 36)

OPECTRG(IC107 PIN 55)

35. Laser Power(Writing)_initial state



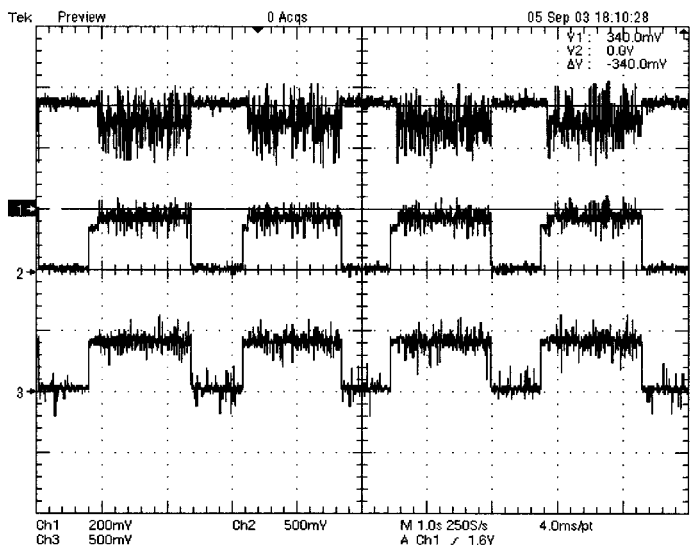
VRDC(IC107 PIN 31)

VWDC1(IC107 PIN 34)

VWDC2(IC107 PIN 36)

OPECTRG(IC107 PIN 55)

36. Laser Power(Writing)_Processing



VRDC(IC107 PIN 31)

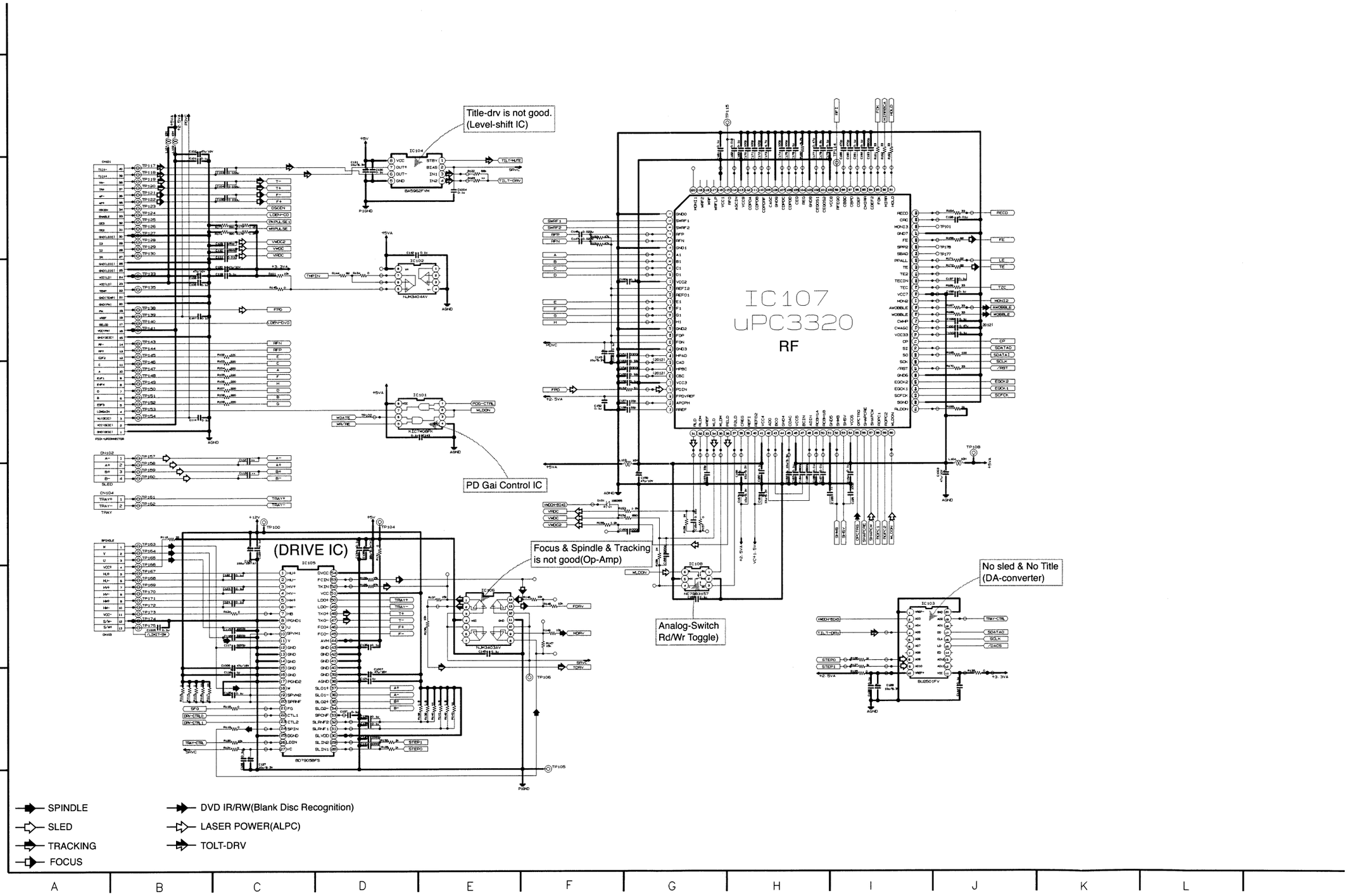
VWDC1(IC107 PIN 34)

VWDC2(IC107 PIN 36)

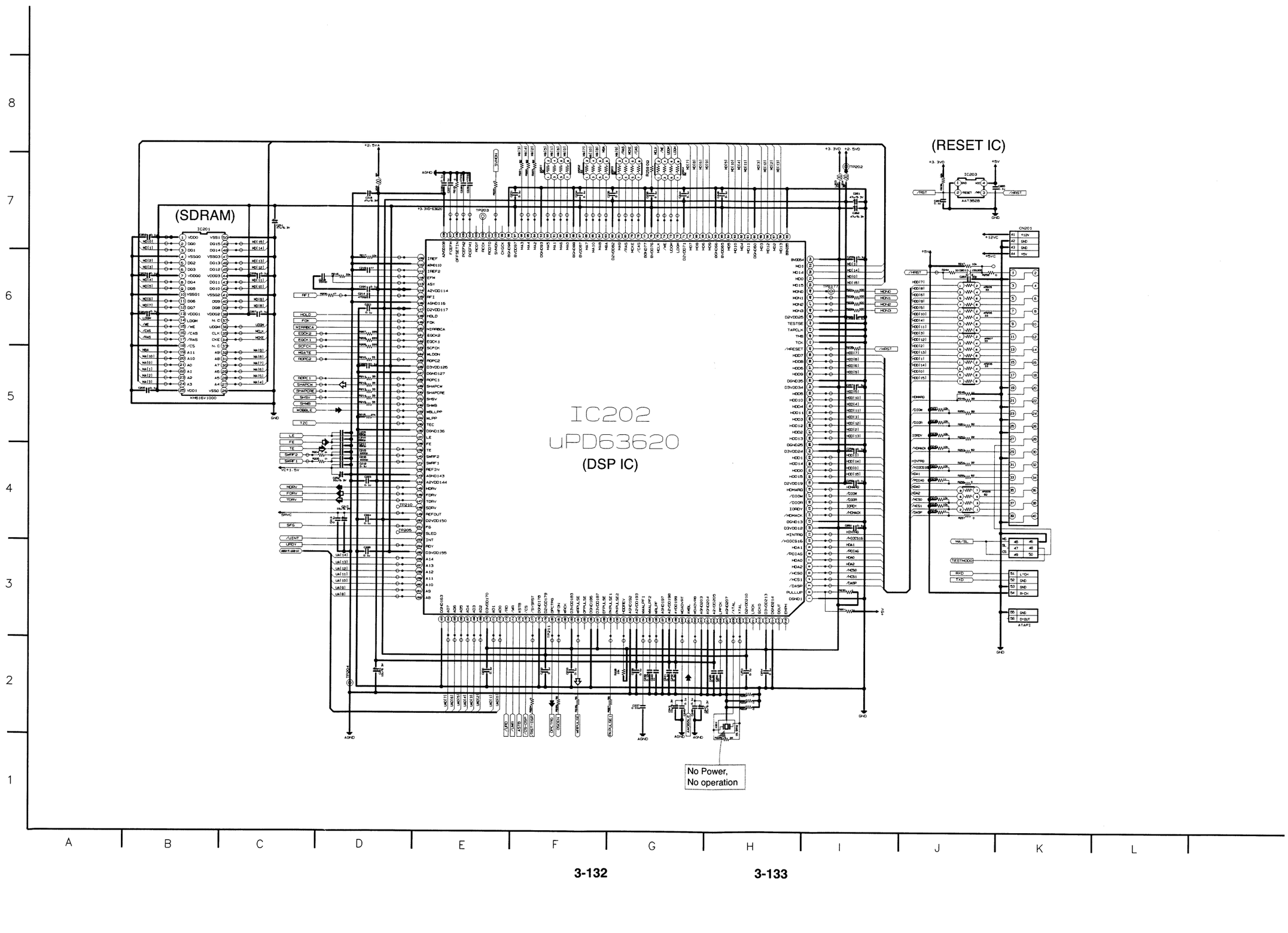
MEMO

CIRCUIT DIAGRAMS

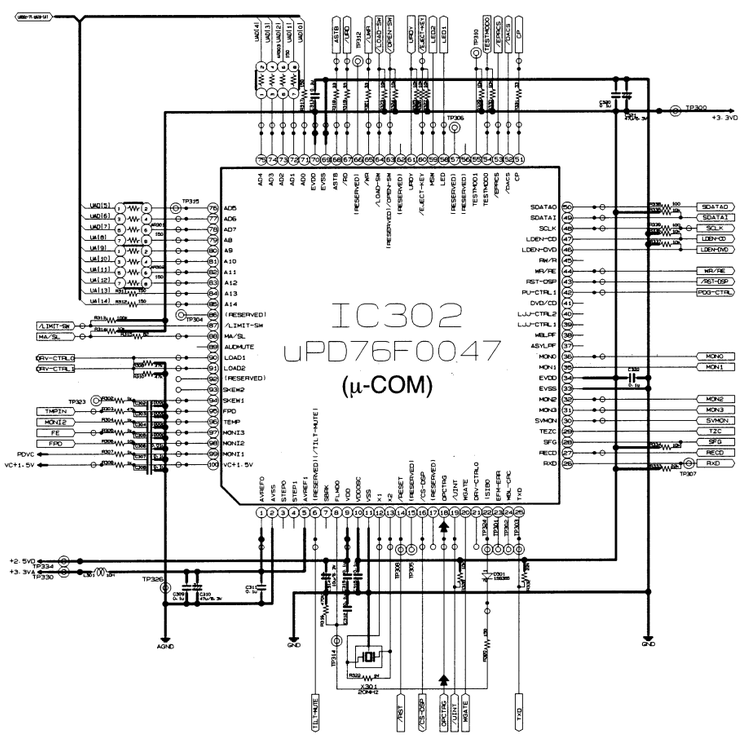
1. RF CIRCUIT DIAGRAM

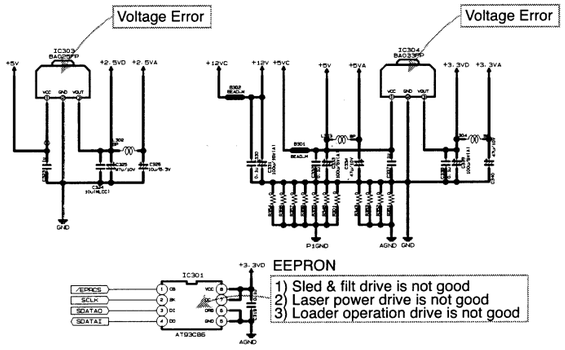


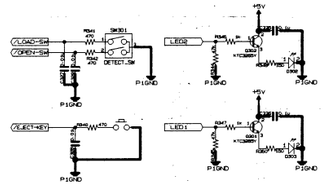
2. DSP CIRCUIT DIAGRAM



3. μ-COM CIRCUIT DIAGRAM

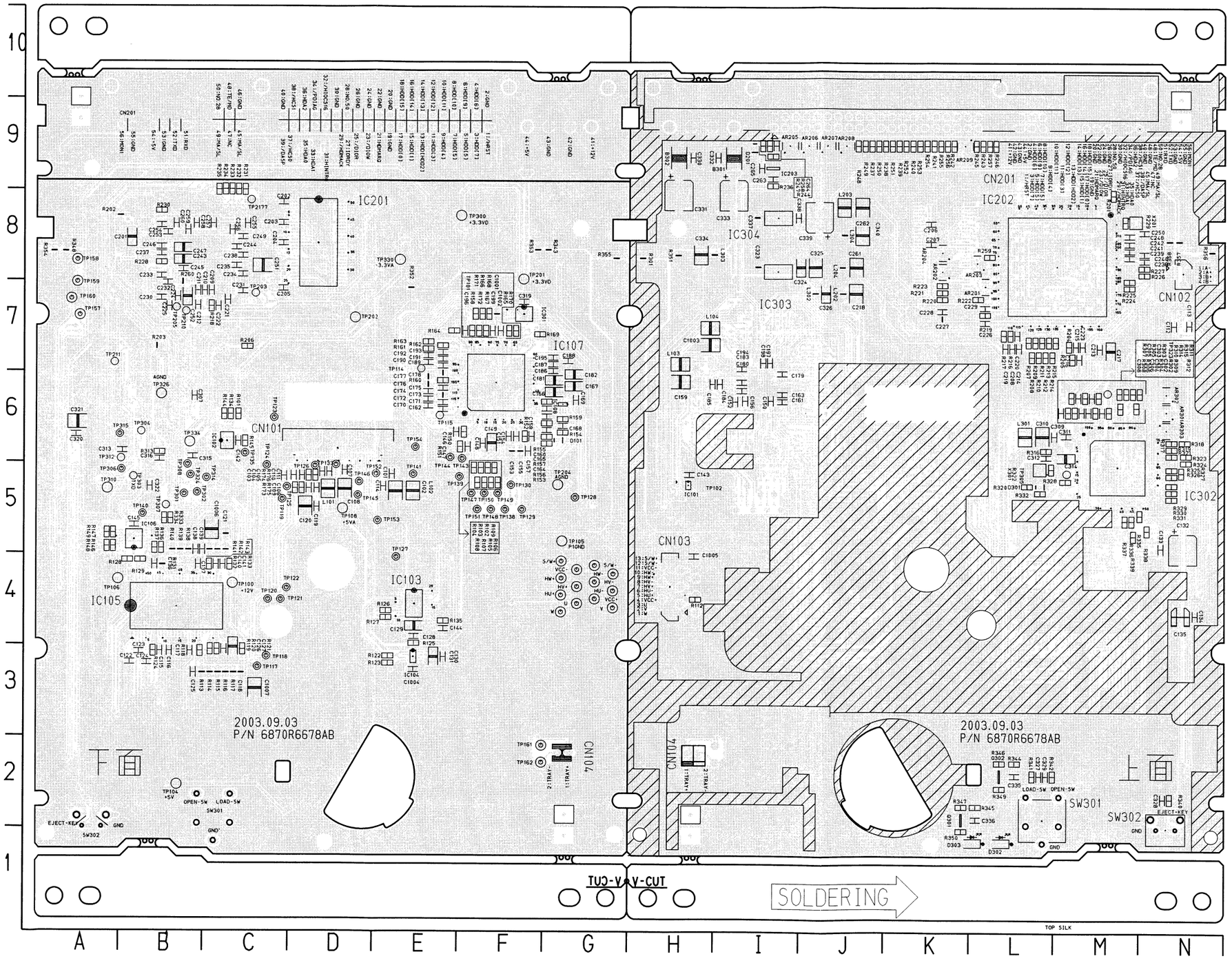



Voltage Error
Voltage Error
EEPRON
1) Sled & filt drive is not good
2) Laser power drive is not good
3) Loader operation drive is not good



PRINTED CIRCUIT DIAGRAMS

1. MAIN P.C.BOARD



LOCATION GUIDE

C1001	F7	C174	E6	IC102	D6	R159	G6	TP1123	E6	TP1153	E5	TP2178	C8
C1002	F7	C175	E6	IC103	E4	R160	E6	TP1129	F6	TP154	E6	TP2179	C8
C1004	E3	C176	E6	IC104	E3	R161	E7	TP114	E7	TP157	A7	TP2180	C8
C1006	C5	C177	E6	IC105	B4	R162	E7	TP1141	F6	TP158	A8	TP2186	C8
C1007	E7	C178	E6	IC106	B5	R163	E7	TP115	E6	TP159	A7	TP2215	D9
C101	E5	C181	G6	IC107	F6	R164	E7	TP1152	E3	TP160	A7	TP2216	D9
C102	E5	C182	G6	IC108	G6	R165	F7	TP1156	E4	TP161	F2	TP2217	D9
C103	E5	C186	G7	IC201	D8	R166	F7	TP1157	E4	TP162	F2	TP2218	D9
C104	D5	C187	G7	IC301	F7	R167	F7	TP1159	E4	TP163	G4	TP2219	D9
C105	D5	C188	G7	L101	D5	R168	F7	TP1167	E4	TP164	G4	TP2220	D9
C106	D5	C189	G7	L102	E5	R169	F7	TP117	C3	TP165	G4	TP2221	C9
C107	D5	C190	E7	R101	C6	R170	F7	TP1178	B3	TP166	G4	TP2222	C9
C108	D5	C191	E7	R102	F5	R171	F7	TP118	C3	TP167	G4	TP2240	B7
C109	D5	C192	E7	R103	F5	R172	F7	TP1189	B4	TP168	G4	TP2252	A8
C110	D5	C193	E7	R104	F5	R173	D5	TP119	C5	TP169	G4	TP2254	B8
C111	D5	C195	G7	R105	F5	R174	D5	TP1190	C4	TP170	G4	TP2257	B8
C114	E5	C196	F7	R106	F5	R175	D5	TP1192	C4	TP171	G4	TP2259	A8
C115	B3	C199	F7	R107	F5	R176	D5	TP1194	C4	TP172	G4	TP2263	B8
C116	B3	C201	B8	R108	F5	R202	A8	TP1195	C4	TP173	G4	TP2265	B8
C117	B3	C202	C8	R109	F5	R203	B7	TP1197	B4	TP174	G4	TP2271	B8
C118	C3	C203	C8	R113	B3	R206	C7	TP1198	B4	TP175	G4	TP300	F8
C119	D5	C204	C8	R114	C3	R218	C7	TP120	C4	TP2004	C8	TP3000	C6
C120	D5	C205	C7	R115	C3	R220	B8	TP1206	C4	TP2007	C8	TP3005	B6
C121	C5	C209	C7	R116	C3	R230	B8	TP121	C4	TP2009	C7	TP301	B5
C122	B3	C210	B7	R117	C3	R231	C8	TP1217	B4	TP201	F8	TP302	B5
C123	B3	C211	B7	R118	B3	R232	C8	TP1218	B4	TP2010	C8	TP303	B5
C124	B3	C212	B7	R119	C3	R233	C8	TP1219	B4	TP2014	C8	TP304	B6
C125	B3	C221	C7	R120	C3	R234	C8	TP122	C4	TP2015	C8	TP306	B5
C126	C3	C222	C7	R121	C3	R235	C8	TP1221	C4	TP2019	C8	TP307	B5
C127	C3	C224	B7	R122	E3	R260	B7	TP1222	C4	TP202	D7	TP308	B5
C128	E4	C225	B7	R123	E3	R313	B6	TP123	C6	TP2020	C8	TP310	A5
C129	E4	C230	B7	R124	E3	R333	B5	TP1230	B4	TP203	C7	TP312	B6
C130	E3	C231	C7	R125	E4	R334	B5	TP1233	G8	TP204	G5	TP314	C5
C131	B4	C232	B8	R126	E4	R343	G8	TP1234	C6	TP2041	D8	TP315	A6
C136	B4	C233	B8	R127	E4	R348	A8	TP1235	C6	TP205	B7	TP324	B5
C137	B4	C234	C8	R128	B4	R352	E7	TP1236	C6	TP2063	C7	TP326	B6
C138	B5	C235	C8	R129	B4	R353	F8	TP124	C5	TP2066	C7	TP330	B8
C139	B5	C237	B8	R131	B4	R354	A8	TP1243	E3	TP2070	C7	TP334	B6
C140	C4	C238	C8	R132	C4	R355	G8	TP1248	E3	TP2075	B7	TP336	A5
C141	C4	C239	B8	R133	C4	R356	G8	TP125	C5	TP2076	B7	TP339	B5
C142	C6	C244	C8	R134	C6	TP1005	G6	TP1250	A4	TP2087	A6	TP350	A2
C144	E4	C245	B8	R135	E4	TP1006	E6	TP1251	A5	TP2090	B7	TP368	B6
C145	B5	C246	B8	R136	B5	TP1007	E4	TP1255	A5	TP2095	B6	TP377	B6
C146	E6	C247	B8	R137	B5	TP101	F7	TP1256	A5	TP2097	B7	TP378	B6
C147	F6	C249	C8	R138	B5	TP1011	E6	TP126	D5	TP210	B7	TP379	B6
C148	F6	C251	C8	R139	B5	TP1012	D4	TP127	E4	TP2101	A6	TP381	B6
C149	F6	C252	B7	R140	B5	TP1017	E4	TP128	G5	TP2102	A6	TP382	B6
C151	F6	C253	B8	R141	C5	TP1019	E6	TP129	F5	TP2105	E6	TP383	C4
C153	F6	C254	C8	R142	C5	TP1025	E7	TP130	F5	TP2106	E6	TP384	B6
C154	F6	C255	C8	R143	C5	TP1027	E7	TP133	D5	TP2108	F7	TP397	B6
C155	F6	C256	C8	R144	C6	TP1028	F7	TP135	C6	TP2109	F7	TP414	C5
C157	F6	C257	C8	R145	C6	TP1029	F7	TP138	F5	TP211	A7	TP415	B5
C158	F6	C258	B8	R146	A5	TP1037	F7	TP139	F5	TP2120	C7	TP417	B5
C160	G6	C259	B8	R147	A5	TP104	B2	TP140	B5	TP2122	C7	TP426	C5
C162	G6	C260	B8	R148	A5	TP1047	F7	TP141	E5	TP2131	C7	TP431	B5
C164	G6	C307	B6	R149	A5	TP105	G5	TP143	F6	TP2134	C7	TP438	B9
C165	G6	C313	B6	R150	F6	TP1059	E7	TP144	E6	TP2135	C7	TP442	B9
C166	G6	C315	B6	R151	F6	TP106	A4	TP145	D5	TP2137	C8	TP443	C9
C167	G6	C316	B6	R152	F6	TP1074	F6	TP146	D5	TP2145	C8	TP444	B5
C168	G6	C319	F7	R153	G6	TP1075	F6	TP147	F5	TP2146	C8	TP447	E5
C169	G6	C320	B6	R154	G6	TP1076	F6	TP148	F5	TP2147	C8	TP450	E4
C170	E6	C321	A6	R155	G6	TP1077	G6	TP149	F5	TP2148	C8		
C171	E6	C322	B5	R156	G6	TP1088	D5	TP150	F5	TP2152	C8		
C172	E6	CN101	D6	R157	G6	TP1088	G7	TP151	F5	TP2154	C8		
C173	E6	D101	G6	R158	F7	TP1116	F5	TP152	E5	TP2177	C8		

AR201	L7	C306	M6	R223	K7	R344	L2	TP1220	N5	TP2196	J9
AR202	K8	C308	M6	R224	M7	R345	L2	TP1232	M5	TP2197	J9
AR203	L8	C309	M6	R225	M7	R346	L2	TP117	I7	TP2198	J9
AR204	K8	C310	L6	R226	M8	R347	K2	TP2000	J8	TP2199	J9
AR205	J9	C311	M6	R227	N8	R349	L2	TP2001	K8	TP2200	J9
AR206	J9	C312	L6	R229	M8	R350	K1	TP2002	L8	TP2203	J9
AR207	J9	C314	M6	R236	J9	R351	N8	TP2003	K8	TP2204	J9
AR208	J9	C323	I8	R237	J9	R356	N8	TP2005	K8	TP2205	J9
AR209	K9	C324	J8	R238	K9	R357	N8	TP2006	I9	TP2206	J9
AR301	N6	C325	J8	R239	K9	R358	N8	TP2011	K8	TP2208	J9
AR302	N6	C326	J7	R240	K9	SW301	L2	TP2013	K8	TP2209	J9
AR303	N6	C327	L2	R241	K9	SW302	N1	TP2016	K8	TP2210	K9
B301	I9	C328	N2	R242	K9	TP100A	H7	TP2018	K8	TP2211	K9
B302	H9	C329	L2	R243	L9	TP1008	J6	TP2021	L7	TP2212	K9
C1003	H7	C330	H6	R244	I9	TP1009	J6	TP2022	K7	TP2223	L9
C1005	H4	C331	H8	R245	L9	TP1010	J6	TP2023	K7	TP2224	M8
C112	N7	C332	I9	R246	L9	TP1013	J6	TP2026	K8	TP2244	M8
C113	M7	C333	I8	R247	I9	TP1014	I6	TP2027	K8	TP2247	M8
C132	N5	C334	H8	R248	J9	TP1015	J6	TP2029	K8	TP2258	M8
C133	N5	C335	L2	R249	J9	TP1016	I6	TP2030	K8	TP2269	N8
C134	N4	C336	L2	R250	J9	TP1018	I6	TP2032	K8	TP2272	M8
C135	N4	C337	I8	R251	K9	TP102	H5	TP2033	K8	TP3002	M6
C143	H5	C338	I8	R252	K9	TP1021	J7	TP2035	K8	TP305	M5
C150	I6	C339	J8	R253	K9	TP1026	I7	TP2036	K8	TP309	N5
C152	I6	C340	J8	R254	K9	TP103	I6	TP2039	K8	TP311	N6
C156	I6	CN102	N8	R255	K9	TP1033	I7	TP2040	K8	TP313	N6
C159	H6	CN103	H4	R256	K9	TP1036	I7	TP2043	K8	TP319	J8
C161	I6	CN104	H2	R257	L9	TP1038	I7	TP2044	K8	TP320	H8
C163	I6	CN201	M9	R258	I9	TP1039	I6	TP2045	K8	TP322	N6
C179	I6	D201	I9	R259	L8	TP1043	I7	TP2046	K8	TP323	M6
C180	I6	D301	L5	R301	H8	TP1041	I6	TP2047	K7	TP327	N6
C183	I6	D302	L1	R302	M6	TP1042	I7	TP2048	K7	TP328	N6
C185	H6	D303	L1	R303	M6	TP1043	I6	TP2055	J7	TP329	N6
C194	I7	IC101	H5	R304	M6	TP1044	I7	TP2058	K7	TP331	N5
C197	I7	IC202	M8	R305	M6	TP1045	I6	TP2059	J7	TP332	N5
C198	I7	IC203	I9	R306	M6	TP1046	I7	TP2060	J7	TP333	N5
C206	K8	IC302	M5	R307	M6	TP1049	H5	TP2061	J7	TP337	M5
C207	K8	IC303	I8	R308	M6	TP1050	I7	TP2074	J7	TP338	M5
C208	L7	IC304	I8	R309	M6	TP1052	I6	TP2080	J6	TP344	M6
C213	M7	L103	H7	R310	M6	TP1058	I7	TP2082	M7	TP345	N6
C214	L7	L104	H7	R311	N6	TP1066	J7	TP2086	M6	TP346	N6
C215	M7	L202	J7	R312	M6	TP1070	J7	TP2088	M7	TP357	N5
C216	M7	L203	J8	R314	M6	TP1078	H6	TP2092	M7	TP361	N6
C217	M7	L204	J8	R315	M6	TP1080	H6	TP2098	M6	TP363	N6
C218	J7	L301	L6	R316	L6	TP1081	I6	TP2103	N6	TP365	N6
C219	L7	L302	J7	R317	N6	TP1085	H6	TP2110	I7	TP370	N6
C220	L7	L303	H8	R318	N6	TP1086	I6	TP2111	H7	TP371	M6
C223	M7	L304	I8	R319	M6	TP1091	H6	TP2112	H7	TP372	N6
C226	L7	Q201	K2	R320	L5	TP1092	I6	TP2113	H7	TP373	N6
C227	K7	Q302	L2	R321	N6	TP1093	I6	TP2114	H6	TP374	M6
C228	K7	R112	H4	R322	L5	TP1095	I7	TP2115	I6	TP375	M6
C229	L7	R201	M8	R323	N6	TP1103	H6	TP2119	L7	TP376	N6
C235	M6	R204	M7	R324	N6	TP1106	I6	TP2121	K7	TP380	L6
C236	M6	R205	M7	R325	N5	TP1112	H6	TP2126	K7	TP402	L5
C239	M8	R207	L7	R326	N5	TP1124	I6	TP2130	K7	TP405	J8
C240	N8	R208	L7	R327	N5	TP1126	I6	TP2132	K7	TP408	M5
C241	M8	R209	L7	R328	N5	TP1127	I6	TP2140	K8	TP409	L5
C242	M8	R210	L7	R329	N5	TP1128	I6	TP2141	K8	TP412	N7
C248	M8	R211	L7	R330	N5	TP1133	I6	TP2142	K8	TP419	N5
C250	N8	R212	L7	R331	N5	TP1134	I6	TP2143	K8	TP420	M5
C261	J8	R213	L7	R332	L5	TP1135	I6	TP2151	K8	TP421	M5
C262	J8	R214	L7	R335	N5	TP1136	I6	TP2153	K8	TP430	M5
C263	I9	R215	M7	R336	M5	TP1142	I6	TP2187	I9	TP432	M5
C264	I9	R216	L7	R337	M5	TP1143	I6	TP2188	I9	TP461	I8
C265	I9	R217	L7	R338	N5	TP1144	I6	TP2189	I9	X201	M8
C302	M6	R219	L7	R339	M5	TP1146	I6	TP2190	J9	X301	L5
C303	M6	R220	K7	R340	N2	TP1148	I6	TP2193	J9		
C304	M6	R221	K7	R341	L2	TP1168	J8	TP2194	J9		
C305	M6	R222	L7	R342	L2	TP1175	M3	TP2195	J9		